COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

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FCC Postpones Datran Closing; Users Covered Until Sept. 15

WASHINGTON, D.C. – The Federal Communications Commission (FCC), which has fostered the growth specialized common carriers, moved here last week to protect customers of the first operational system to fail.

Just 24 hours before service was to be shut down on Thursday, the FCC ordered Data Transmission Co. (Datran) to remain operational until September 15 or until all users could find alternative services, whichever is first.

At a Thursday afternoon board of directors meeting – called primarily to formally declare bankruptcy – the Datran board voted to go along with the FCC request. In its order, the FCC granted Datran's request to end service, but said the firm had not given users sufficient notice.

At the same time, the commission ordered Wyly Corp. – Datran's parent company – to forward the funds needed to keep Datran operational for the 20-day period.

Last week at the deadline for service cutoff, the Datran and Wyly boards agreed to advance $250,000 in order to keep the network operational.

The money will go to an operating receiver which will maintain the Datran network temporarily.

The FCC earlier on Thursday had asked a federal district court judge in Alexandria, Va. to restrain Datran from going bankrupt unless the firm guaranteed to continue operations.

When Datran and the Wyly board agreed to fund the continued operation the point was moot.

Datran Users Seek Nets As Data Carrier Goes Broke

A CW Staff Roundup

Users, government officials and the shattered remnants of Data Transmission Co.'s (Datran) management searched frantically for alternatives last week in the wake of the firm's decision to discontinue data communications services as of 5 p.m. Thursday.

Giving users only seven days' notice, Datran said it would go out of business due to financial problems which have beset the firm for the past eight years.

While the remainder of Datran management pushed for bankruptcy and Federal Communications Commission (FCC) attorneys debated whether they could force the firm to continue operating, most users contacted were able to find at least short-term solutions to their most pressing problems.

Reactions ranged from philosophical to bitter. Almost all users contacted last week reported an excellent response from AT&T and the specialized common carriers who tried to configure systems and deliver equipment to keep them going after all the Datran lines were scheduled to go dead. But most ended up with AT&T since only it could promise quick delivery local loops.

Reaction of Shock

Users at Options Clearing Corp. in Chicago "were shocked that a company like Datran could pull the switch on service with only four [working] days' notice," according to Jack Pecot, vice-president for DP.

"We read about it first in the *Wall Street Journal* and then called Datran to find out what the story was," he said.

The clearinghouse had been using a 56K bit/sec digital line from Datran between Chicago and New York and two 9,600 bit/sec lines between Chicago and San Francisco to transmit data.

Pecot contacted some "higher ups" at Western Union as soon as the Datran announcement was confirmed. Western Union service personnel worked all weekend to bring up service, promising to turn over lines for testing by last Thursday, Pecot said.

Coverage of Datran closing continues on Pages 4 and 5.

Because of the critical nature of the clearinghouse's transmissions, "we were thinking of getting a temporary restraining order forcing Datran to stay in business until 9 a.m. Friday.

"We're 100% confident of getting up on Western Union" for processing Friday night's work and transmitting Monday, Pecot said. But he wasn't so sure about Thursday at 5 p.m.

Besides inconvenience, however, the changeover will cost the clearinghouse 35% to 50% of its annual teleprocessing budget, Pecot estimated.

Reacted With a Scream

At Panasonic headquarters in Secaucus, N.J., Fred Ilardi, general manager of DP, said his initial reaction was to scream.

And scream he did, all the way to the FCC in an attempt to convince it of the necessity for uninterrupted operation.

Ilardi has an on-line accounts receivable system operating over two circuits connecting nine cities.

Panasonic has ordered gear from AT&T. Although it is more expensive than other competitors, Ilardi said he felt he had no choice since the others depended on AT&T to supply the local loops.

He had scheduled a meeting with AT&T representatives prior to the Datran announcement. Within one day, AT&T had one leg in place and was working on the key local loops, he said.

In the interim he flew billing personnel

(Continued on Page 3)

Dream Dead After Eight Years; Wyly Determination Not Enough

By E. Drake Lundell Jr.
Of the CW Staff

The computer community "must take the initiative in demanding better data transmission service from the existing telephone and telegraph carriers. We must also take the initiative in seeking alternatives." Sam Wyly, May 5, 1970.

"Despite the determined efforts of the FCC [Federal Communications Commission] to foster full and fair competition in the telecommunications marketplace, the telephone monopoly continues to be the dominant force." Sam Wyly, Aug. 19, 1976.

VIENNA, Va. – A lot of water has flowed under the bridge in the six years between the time Sam Wyly keynoted the 1970 Spring Joint Computer Conference and the time he announced the closing of Data Transmission Co. (Datran), his firm's entry into the fledgling market for specialized common carriers.

And for most of that time Sam Wyly has been juggling, reorganizing and selling parts of his Wyly Corp. empire just to keep Datran, which pioneered the idea of an all digital network for communications, afloat.

Now the idea is dead as Wyly Corp. closed Datran's operation on Aug. 19, giving users just a week to find other sources until prodded by the FCC to extend the deadline.

Over the eight year life of Datran almost $100 million had been pumped into the firm, largely from Wyly Corp. and from one other investor, Walter Haefer Holding AG of Zurich, Switzerland.

But even at the height of its operation – just before it closed the doors – the digital data transmission network had attracted just 150 users and was generating only $400,000 in billings each month.

In announcing the closing of the operation, Datran immediately laid off 200 people; it kept just 40 on the staff for one week in order to keep the network operational so users might find other sources for their data communications operations.

However, one week is little time for configuring a data communications net-

(Continued on Page 4)

Cites New Price/Performance

Univac Drops Series 90 Prices

By Molly Upton
Of the CW Staff

BLUE BELL, Pa. – Univac Series 90 machines will carry lower price tags as a result of reduced memory prices reflecting the use of 4K MOS memory throughout the line.

Along with a performance enhancement feature for the 90/60 and a CPU price drop on the 90/70, the memory price cuts have "significantly improved" the cost/performance ratios of the systems, Univac said.

The moves, intended to make the Series 90 a competitive alternative to IBM's 370/138 and 370/148, include reductions in both purchase and lease prices.

Some of the features included in the Univac announcement are:

- Reduction of the 90/70 CPU purchase price by about 25%.
- Reduction of the 512K 90/60 system purchase price by about 45%.
- Availability of 4K MOS memory for the 90/30, 90/60 and 90/70.
- Field upgradeable additional memory capacity on the 90/30, 90/60 and 90/70.
- A 90/60 performance enhancement package that is said to provide a 25% increase in instruction execution speed.
- Reduction of rental and purchase prices of the 90/80's 512K increment memory by 42% and 57%, respectively.

The 90/30 memory capacity has been doubled to 512K bytes, although it can be contained and powered within the CPU, Univac said. Price reductions range up to 19% for 90/30 main storage and apply to increments of 65K or more.

With the larger memory, performance of the IMS/90 can be improved when used in an application mix of an on-line management information system and conventional batch programs by decreasing terminal response times and increasing throughput by supporting more levels of

(Continued on Page 2)

Software Untaxable: Tenn. Court

By Don Leavitt
Of the CW Staff

NASHVILLE, Tenn. Software programs acquired by a user from an outside source are intangible personal property regardless of how they are transmitted and therefore cannot be taxed under the Tennessee Sales and Use Tax Law, according to a decision handed down by the state supreme court here.

Ruling for the Commerce Union Bank and against the commissioner of revenue, Judge William H.D. Fones said "what is created and sold here is information."

The "tangible reel of tape" used to transmit the programs from the originator to user – the crux of the state's case – is "merely incidental," especially since it wasn't even retained by the bank, the judge added.

The decision sets a precedent. While other court cases have been concerned with software and property taxes and with patent protection, Commerce Union Bank vs. Tidwell is the first case at a state supreme court level to consider the application of sales and use tax statutes to programs, according to attorney Alfred L. Abbey of Trabue, Sturdivant & Dewitt, who argued the case for the bank.

In its case, the state argued that the purchase of software was "analogous to the purchase of a phonograph record or the purchase or lease of a motion picture film" which had already been ruled tax-

(Continued on Page 2)

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Expands Memory Limits

Univac Lowers Prices on Its Series 90

(Continued from Page 1)

multiprogramming, the firm said.

Systems up to 256K are being shipped currently with the new MOS circuits and deliveries of 90/30s with memory above 256K will begin in the fourth quarter of 1976. For expansion above 256K, there is a field installation charge of $400, a spokesman said.

The type of memory provided to the user depends on the age of the processor and the amount of expansion involved.

On an older processor going above 256K, the memory will be replaced with 4K chips; whereas in expanding up to 256K, the memory will consist of either additional 1K chips or replacement with 4K chips, depending on availability, he said.

Recent processors will be accommodated by the addition of 4K chips without any replacement of existing memory, he said.

Univac said modifications of the 90/60 have "significantly improved its price/performance ratio and placed it competitively in the gap between" IBM's 138 and 148.

"A typical configuration of the 90/60 is more powerful than a comparably priced 370/138," Univac claimed.

Univac has spruced up its 90/60 by quadrupling its memory capacity to 2M bytes of MOS memory, cutting the purchase prices on a 512K system by 45% and dropping the five-year lease price tag 21% below previous charges on comparable systems.

The new prices for a 512K 90/60 memory/CPU complex, including selector channel and a 1 byte multiplexor channel, are for $7,894/mo including maintenance, on a five-year plan.

In addition, the firm is offering a performance enhancement feature which will provide a 25% increase in instruction execution speed, according to the firm.

This kit leases for $238/mo including maintenance, sells for $9,000. It embodies enhancements to the micro logic, a spokesman said.

The minimum main memory size for a 90/60 is now 512K bytes rather than 128K for OS/4 systems and 256K for VS9 systems, a spokesman said.

Add-on memory increments of 256K bytes lease for $1,305/mo each, including maintenance on a five-year plan. The purchase price is $46,800 for each increment, Univac said.

The typical monthly lease for a 90/60 with 512K bytes of main storage, 600M bytes of auxiliary disk storage, four tape units and a standard complement of unit record peripherals is $20,534.

The main memory capacity for the 90/70 has been doubled to 2M bytes.

Prices for the 256K-byte increment of main storage for the 90/60 apply to all increments above 512K bytes in the 90/70, Univac said.

In addition, the purchase prices on 90/70 processors and processor features have been reduced by about 25%.

The monthly lease charge for a typical 90/70 is $35,965 for a 1M byte unit with 1,200M bytes of auxiliary storage, six tape units, multiple printers and standard unit record equipment. The purchase price is $1.5 million.

On the 90/80, which was announced with the 4K memory, prices for main storage above 1M byte have been reduced. Previous rental charges for 512K of storage have been reduced by 42%. The purchase price of these increments was slashed by 57%.

For example, the five-year lease price, including maintenance, for a 512K-byte increment is now $2,687/mo and the purchase price is $96,300.

The 90/70 and 90/80 now bracket the 148 in performance and price.

Software Untaxable: Tenn. Court

(Continued from Page 1)

able under Tennessee law.

Fones rejected that concept, noting that motion picture film is different because it is inherently related to the movie itself and without the film there can be no movie.

Neither magnetic tape nor cards are crucial in software; a program could be transmitted orally or electronically without any tangible evidence of transmission.

The state did not try to "tax computer programs purchased by [the bank] which were transmitted to its computers from outside the state by way of telephone lines," Fones noted.

"That method of transmission, without question, constitutes the purchase of intangible personal property," he continued. "The principle is the same, only the method of transmitting the information differs" when tape is used, he added.

As a result of Fones' ruling, the bank recovered $4,000 in sales taxes collected from it for use of several software packages from 1968-1971. Although the money involved is small, the principal involved is substantial and should have applicability across state lines, Abbey said.

Writing about the case in *Computer Law and Tax Report*, attorney Robert Bigelow, agreed. Summarizing several cases, he showed how the definition of tangible personal property – and presumably, by extension, the definition of "intangible property as well – has differed from state to state till now.

But he closed with a call to his readers to "act now . . . if you have paid sales, use or property taxes on programs, talk with your tax department as soon as possible to see if it is practical . . . to claim a refund."

The Nashville bank's battle started as a result of an audit by state tax officials in late 1971. As a result the bank was assessed a deficiency for various things including the programs Commerce acquired during the 1968-71 period.

Conferences between the bank, its council, and the state lasted six months and cleared away most of the items. However the status of the purchased software, which included both utility and application packages, could not be resolved that way.

Commerce Union paid the demanded tax under protest and filed suit in mid-1972 to recover it through the courts.

The Chancery Court for Davidson County ruled in favor of the state, based on the movie film analogy. The bank appealed.

On the Inside This Week

NEWS

Rivals Ponder Supporting Datran System 4
Wyly Corp. Files Antitrust Suit Against AT&T 5
French Cabinet Adopts Bill on Privacy Legislation 6
DP Teachers Refuse to Participate in Exchange Plan 7
Moss Charges LEAA Grant Requests Illegally Reviewed . . .8
Cartoons Reflect Public's Feelings About DP 11

EDITORIAL

Editorial: Moving Forward 12
White Hat, Black Hat: Another Establishment 13
Taylor Report: Instructions for Edits Must Be Detailed . . .13
DPers Must Make Themselves Professionals 14

SOFTWARE & SERVICES

Ansi OKs, Ecma Defers Acceptance of PL/I Standard 15
Resources System Combines Census, EEOC Data Use 16
With Current Tools, Even Cobol Can Be Used in GDP 17
Open Paths, Active Guidance Help Staff to Develop 18

COMMUNICATIONS

Insurer Starts From Scratch to Build Net for Future 21
Phone Costs Drive School to Mini for Net 22

TERMINAL TRANSACTIONS

Bureau Finds Its Hand-Held Units Can Empty a Room . . .24
Bank Has Teller Unit in Lobby for Apartment Dwellers . .25
HP Adds Micro-Based CRT for Local, Distributed Nets . . .26

SYSTEMS & PERIPHERALS

Center Ties Amdahl CPU With CDC Gear 27
Bank's On-Line COM Cuts Time of Record Production . . .28
Baker Benefits From Terminal Ingredient 30

MINIWORLD

Manufacturer Cuts Costs With Turnkey 33
New Software Usually Good, But May Have Problems 34
University Finds 'Big Name' System Not Needed 37

COMPUTER INDUSTRY

Amdahl, IBM Cross-License Patents 39
Varian Aims Distributed Processing at Commercial Area . .40
Maker of Programmerless System Eyes Rapid Growth 43

FINANCIAL

HP Net Dips in Quarter, Nine Months 56
DEC Posts Record Year as Earnings Climb 60% 56

***CW Special Report on Minis and Small Business Systems Follows Page 32**

Datran Users Scramble for Alternatives As Net Dies

(Continued from Page 1)

from Chicago and Atlanta to Secaucus where they began inputting accounts receivable on CRTs connected to the local CPU. Response time on the Datran net had deteriorated to between 15 to 20 minutes, he observed.

Initially, AT&T was quoting 17 to 20 working days to get Panasonic's network in place. However, that was expedited considerably, he said, adding he wasn't sure if the pressure came from the FCC or from his use of AT&T executive names.

Personally Distressed

At American Hospital Supply Corp. in Waukegan, Ill., Ralph Wallio, DP manager, said he was personally distressed about the Datran failure since it "doesn't say much about the maturity" of the data communications field.

His firm had been planning to expand its use of Datadial and make greater use of its full capabilities, but now it will be restricted to "more conventional" types of service, he said.

American, Wallio said, had been aware of Datran's financial position, adding that staying with the firm was a "calculated risk." But at the same time, they were happy with the service.

American had about 100 terminals in the field, split equally between Bell facilities and Datran facilities, he said. Seventy-five percent of the data actually went over the Datran circuits, accounting for 60,000 connections each month.

"It was a very cost effective and operationally effective service," he said. "It will be missed."

The firm is switching back completely to Direct Distance Dialing from Bell, he said, noting that Bell's response had been "excellent" and he anticipated no crisis when the Datran system stopped operating.

Republic Financial Services in Dallas had been able to solve the problems of its 24-hour dedicated lines through a hookup with Southern Pacific Communications Corp. (SP) and Bell local loops, according to spokesman Don Eisan.

But by mid-week the firm was still wondering what to do with its batch lines, he said.

Eisan said he was "disappointed" by the move because he felt the Datran service was "far superior" to that offered by Bell and it also cost less.

At the time of the shutdown the firm was running 80% of its data on Datran, but had more problems with the 20% that was on the Bell network, Eisan said. "Now I'm worried," he said in reference to the greater reliance the firm will now have on Bell.

"We never had one or two hour service delays with Datran," Eisan added, noting that delays of even longer were common with Bell.

Republic operated 21 terminals in the field on four dedicated Datran lines, he said. The savings had been worth the risk faced by going with an independent vendor.

The response from SP had been excellent in trying to solve the problems raised by the Datran closing, he said. However, he added, it was hard to get Bell even "to return my phone calls."

"Not confident," but feeling better than when the announcement was first made, Ken Behling, data center manager at Taylor Forge, a Chicago subsidiary of Gulf and Western Industries, Inc., said last Wednesday he was working with both SP and AT&T to have his system ready to operate when Datran closed down.

'Panic and Confusion'

There was "panic and confusion" when Taylor first got the message he said, noting the firm had heard about the Datran shutdown secondhand and not from Datran itself.

The firm had been operating three Datran Datadial links and one Datran leased line, with two of the Datadial links having low-speed Bell backup. The Datran leased line operated at 9,600 bit/sec and the firm may have to go to 4,800 bit/sec lines from Bell, he indicated.

Personally, he said, the experience with Datran had made him leary of the specialized carriers indicating that he felt many users would now fall back on Bell for all their communications needs, hurting the remaining specialized carriers.

At the same time, however, Behling said the specialized carriers offered real dollar savings to users, but in the future they might have more backup for their systems.

He also indicated that Datran had not been "that great" on its dial-up service and its leased line operation was just equal to or a little better than the Bell offerings, even though the Datran service cost less.

Bell seemed to have a shortage of modems, Behling noted. When the Datran announcement was first made, he said Bell quoted a two to three week wait for delivery, but early last week said they would be able to get them in by the deadline for Datran's closing.

"We'll have substantial problems if we don't get them," he added.

At Data Resources, Inc. in Lexington, Mass., the Datran lines were already on their way out the door when the announcement of the shutdown hit.

Don Lanoue, manager of telecommunications service, said he was dissatisfied with the Datran service and felt the system was "not reliable."

Previously the firm had Bell leased lines backing up the Datran network and ordered a Dataphone Digital Service link to replace a Datran 208 link the day the announcement was made, he said. Bell installed a 9,600 bit/sec link to Washington, D.C. within four working days, he noted.

Lanoue said he was not disappointed at the Datran failure, since his firm had had "a lot of grief with Datran." He noted that the Datran service personnel in the Boston area were "excellent," but the service in New York and Chicago was bad. "Taking five hours to fix a problem is ridiculous," he said.

At McDonnell Douglas Automation Corp. in St. Louis, there won't be any problems because Datran was being used in parallel with leased lines, according to William Harris, communications manager.

'Didn't Burn Bridges'

"We had a number of lines in on an experimental basis to a number of our McAuto sales offices where we have terminal equipment, but it was experimental and I didn't burn any of my bridges behind me," he said.

T.M.

LOOK

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JOB          STEP        TOTAL      LT FIX      LT FIX
                         PAGES      BLW V=R     ABV V=R
PRODJOB1     STEP4        90         00          00
PAGEABLE     LINKPACK     80         00          08
TESTJOB2     STEP1        20         00          00
XJOB         LNK          12         00          00
*NUC 30      SQA 16      LSQA 8         LRG AVL V=R 30 OF 30
*PAGES IN/SEC 45     PAGES OUT SEC 40
```

THRASHING DIAGNOSIS

```
JOB         STEP      % USING   % WAITING   % WAITING FOR   PRIORITY
                        CPU      FOR CPU     I/O OR WORK
PRODJOB1    STEP3       92%       00%          08%           [illegible]
OPERATING   SYSTEM      06%       00%          94%           15
TESTJOB     STEP1       02%       96%          02%           03
XJOB        COBSTEP     00%      100%          00%           06
*THE CPU IS BUSY 100% OF THE TIME
```

HIGH PRIORITY, CPU BOUND JOB DIAGNOSIS

```
CHN/UNIT   TOT   VOL      JOB        STEP     FILE       BSY   CYL   CWT
           BSY
*CHN    1  32%
 CHN    2  15%
*DSK  152  50%   DISK03   PRODJOB1   STEP5    INFILE     22%   160   05%
                          PRODJOB1   STEP5    OUTFILE    12%
                          TESTJOB2   STEP1    SYSUT3     10%
                          XJOB       GO       LIBFILE    06%
 DSK  233  20%   DISK04   PRODJOB1   STEP5    MASTFILE
 DSK  130  10%   SYSRES   OPERATNG   SYSTEM                          02%
```

DEVICE CONTENTION DIAGNOSIS

```
    SYSDSN          TEST.LIB
   *TESTJOB3        STEP1              OLD
    INIT1           PRODJOB2           SHR
    INIT2           TESTJOB4           SHR
    INIT3           PRODJOB[illegible]           SHR
    INIT4           YJOB               SHR
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AT&T Suit Worries Ford Appointee

WASHINGTON, D.C. - The new chief of the White House Office of Telecommunications Policy (OTP) questioned the wisdom of the Justice Department's antitrust suit against AT&T here last week.

"A good question to ask Attorney General Edward Levi is: Did the Justice Department look at the economic consequences of that action before it brought the suit?" Thomas Houser told reporters here.

Sources believe the remark was politically motivated -- to make President Ford look "more neutral" on the issue since the former OTP head already supported the suit and Democratic presidential contender Jimmy Carter recently came out in favor of it.

Until recently Houser was a partner in Sidley & Austin, but said he did not work on the antitrust suit it is handling for AT&T.

Rivals Ponder Supporting Datran System

By Molly Upton

Of the CW Staff

At least two of the other specialized common carriers drew up plans to offer to run Data Transmission Co.'s (Datran) network on a temporary basis and to provide users a chance for an orderly transition to other carriers.

But the sudden flight to American Telephone & Telegraph (AT&T) by many large Datran users caused Southern Pacific Communications Co. (SP) to shelve its plan to operate the entire network for 45 to 60 days, according to Rex Hollis, SP vice-president of marketing.

MCI Communications Corp. submitted an offer to the Federal Communications Commission (FCC) at the FCC's behest to run the Datran network on a temporary basis, according to John Worthington, vice-president and general counsel.

Because SP depends on Datran's Kansas City-St. Louis link to provide service to its own customers, it is prepared to go "to any reasonable length to keep that section up and running," Hollis said.

The motivating factor behind the plans of both SP and MCI was the good of the industry, Hollis and Worthington said.

"It was absolutely imperative that there be some alternative available to these people and we just felt that certainly the industry would suffer if these people were left high and dry," Hollis explained.

The SP plan was conceived over the weekend following Datran's announcement last Thursday of its plans to cease operations.

Large Users Elected AT&T

But when SP started calling large Datran customers Monday morning, it found many of the large users had elected to use AT&T services. The users told SP that AT&T had promised to try to get them in service by last Thursday or Friday.

The exit of large users from the Datran net made the idea of operating the net unfeasible to SP, Hollis said.

Hollis said SP had in fact considered long and hard the prospect of buying the Datran system before the closing announcement came.

SP regretfully concluded it could not make the network a profitable venture and rejected the idea, he said.

However, "we definitely intend to ask for permission to continue to operate the portion from Kansas City to St. Louis and are going to apply to the Federal Communications Commission for emergency authority to do that.

"We have a great number of our own customers over that route. We want to step in and pick it up just to make sure that portion of it doesn't go down."

SP is willing to assume full responsibility for the link, including paying bills from the day it begins operations, he said.

Hollis explained that is the only portion of the Datran net it intends to operate. SP has asked to lease that portion from Datran, he added.

SP has not as yet offered to buy that portion of the net, since the whole matter is so unsettled, Hollis said. He also doubts it would be for sale since the whole Datran backbone system goes through there.

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WANG

Wyly's Net Dies Painful Death

(Continued from Page 1)

work that may have been years in the making as users found out last week as they raced against the 5 p.m. Aug. 26 deadline (see related story this page).

Not Unexpected But a Shock

The move was not entirely unexpected, but it was a shock nonetheless.

As one long-term employee said last week: "We knew the company was on the brink but it has been there before and something always happened at the last minute to keep us from going over."

In the corporation's 1975 annual report, Wyly warned "it is not an overstatement to say" a proposed refinancing plan "is a survival plan for Wyly Corp."

At that time the firm was trying to restructure its debt so that $108 million of it – largely caused by Datran – would be turned into equity within the corporation. That restructuring is still underway at Wyly; its fate remains in doubt with the closing of Datran.

Wyly also reported in the annual report that "during the past few years of financing Datran we have not been able to meet interest and principal payments out of operations. The cash has been generated largely by the continual (and sometimes costly and painful) sale of assets."

In spite of some of the company's moves to reduce debt, in April 1976 Wyly wrote: "Our costs are still unmanageable in view of our foreseeable inability to pay them. Our cash needs remain pressing and substantial."

In addition, the firm had been actively trying to sell Datran for the past six months and had even offered to let it go for nothing – if a buyer would assume the massive debt of the company.

All that is a far cry from the brasher Wyly that keynoted the Spring Joint Computer Conference back in May of 1970.

At that time, Wyly, who was just getting his feet wet in data communications, indicated that the foremost problem facing computer users "is the bottleneck in data transmission," adding that "the absence of reliable, high-speed, low-cost access to computers and data banks has led us to the brink of disaster.

'Confronted With a Crisis'

"We are confronted with a crisis in data transmission," he said then. "It will lead us to a national crisis. The crisis in data transmission will slow the growth of an economy which is now based on knowledge."

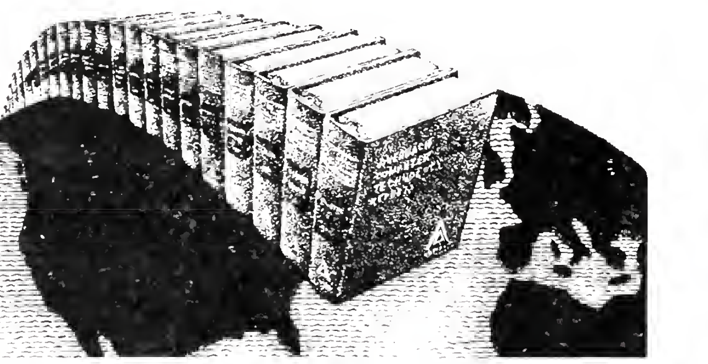
"Whatever slows the use of computers, slows not just the sale of them, but the social and economic growth of all businesses, of all the professions, indeed, of all nations that look to the computer as an incomparable instrument in human service."

That challenge to the computer community was far different from Wyly's final word last week.

In a statement prepared for release when the firm formally declared bankruptcy in federal district court on Friday, Wyly said: "Our efforts to secure financing necessary to continue the business of Datran were seriously impaired as a result of AT&T's [American Telephone and Telegraph] action to institute services at rates which were about 40% below Datran's rates.

"In June of this year administrative law judges of the Federal Communications Commission found certain of such AT&T rates to be unlawful, unreasonably low, anticompetitive, predatory and specifically designed to eliminate Datran.

"That Datran has indeed been eliminated is now a fact. The cause has been documented. We now look to the court for justice in this matter."



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Antitrust Violations Charged

Wyly Corp. Sues AT&T, Seeks $285 Million in Damages

WASHINGTON, D.C. – Wyly Corp. has filed suit against American Telephone & Telegraph Co. (AT&T) for allegedly keeping its subsidiary, Data Transmission Co. (Datran), out of the data transmission and digital data transmission services market in violation of federal antitrust laws.

The suit, filed in U.S. District Court here, seeks $285 million in damages.

The action was brought by Wyly on its own behalf as Datran's majority owner and also as assignee of Datran after announcing its intention to cease operation.

The suit charges AT&T and its associated operating companies with possessing monopoly power in providing data transmission services in violation of the Sherman Antitrust Act and using this monopoly power to impose predatory rates and practices to block competition.

Specific Violations Cited

The complaint alleges five specific violations:

- Monopolization of data transmission services.
- Attempt to monopolize data transmission services.
- Attempt to monopolize digital data transmission services.
- Combination and conspiracy to monopolize data transmission and digital data transmission services.
- Combination and conspiracy in restraint of trade.

Wyly charged further that AT&T has used its monopoly power to engage in deceptive marketing techniques and false predictions to customers concerning availability of its own digital data transmission services. Wyly also charged AT&T with granting or withholding services to actual or potential data transmission service customers and instituting and proposing unreasonably low rates for data transmission services predicated on false or misleading analyses.

The suit also charged AT&T with establishing unreasonable conditions under which it and its operating companies deal with Datran and its customers that place Datran at an unfair competitive advantage. It further charged AT&T with barring Datran's entry into the data transmission business.

Specifically, the suit alleges that AT&T established rate structures resulting in "unreasonably high" charges to Datran for leasing an interconnecting local transmission line or "local loop." AT&T was additionally charged with refusing to lease long distance lines to Datran and its actual or potential customers or establishing wholesale rates for long lines high enough to exclude competitors from providing services at competitive retail prices.

Monopolizing the Marketplace

The complaint also charged AT&T with monopolizing the marketplace for data transmission and digital data transmission services.

According to Wyly, these services can be provided on the basis of "private line" service, consisting of data circuits leased to users for communication between the designated points; and "switched" service, in which a user may be connected to any other user on the system.

Wyly charged that AT&T has been able to obtain more than 90% of all revenue generated by data transmission services because of the dominance of its nationwide telephone network.

'Wholly Without Merit'

AT&T's attorneys are studying the complaint. Based on their initial look as well as press reports and past allegations by Datran, they believe the charges are "wholly without merit," according to Larry Coffin, AT&T press relations manager.

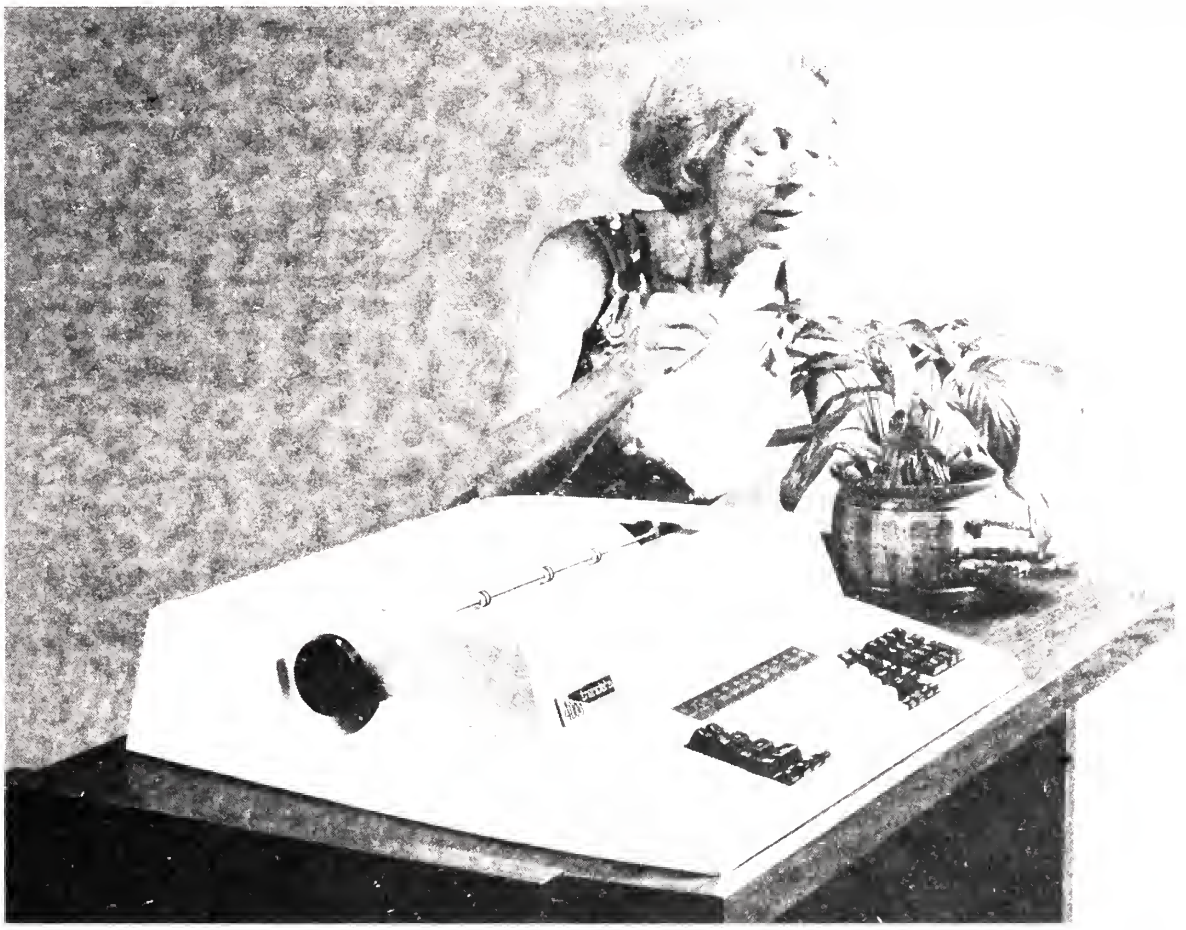
Datran was founded in 1968 and licensed as a specialized common carrier devoted to data transmission. Unlike AT&T, Datran provides no voice communication service.

Certain rates for AT&T's digital data transmission have been found anticompetitive by administrative law judges of the Federal Communications Commission (FCC).

In particular, the rate for data under voice/dataphone digital service was offered by AT&T 40% below those set by Datran.

On June 22, 1976, the FCC's administrative law judges ruled these data transmission rates unlawful, unreasonably low, anticompetitive, predatory and specifically designed to eliminate Datran.

"In its haste to accelerate its program for data transmission participation and its zeal to develop extremely competitive rates for digital data service, AT&T has deliberately understated the actual cost of providing that service. This resulted in the development of a DDS [Dataphone Digital Service] test rate about half of Datrans' end-to-end charges," the judge said.



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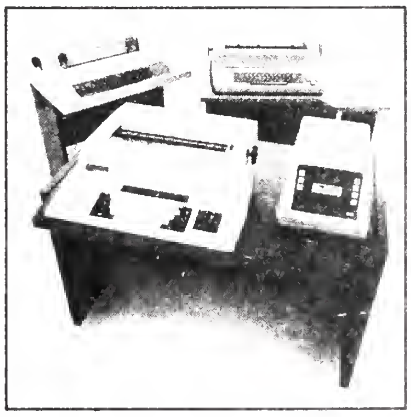

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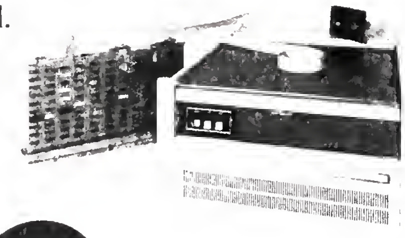

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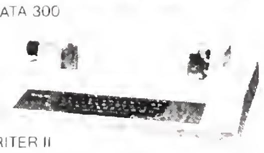

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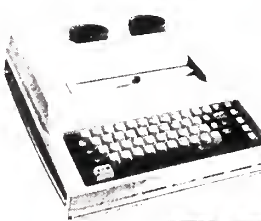

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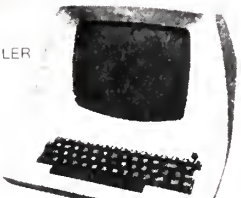

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French Cabinet Approves Bill Proposing Privacy Legislation

PARIS A privacy bill, limiting the use of computerized personal information in both the public and private sectors, has been adopted by the French cabinet and will be presented to Parliament this fall.

The bill provides for a national privacy commission similar to the UK's Data Protection Authority to control use of personal information. To be known as the Commission Nationale Informatique et Libertes, this body of 12 commissioners would be composed of representatives of the government, the legal profession and the DP industry, according to *Computer Weekly*.

While both public and private sectors will be regulated by the commission, they will be treated differently under the proposed law.

The private sector will be required only to submit to the commission details of any planned systems containing personal information. These applications will be made public by the commission.

However, the commission will have a veto power over systems proposed by government agencies, *Computer Weekly* said.

Individuals will have the right to access information about themselves in computer files kept by both government agencies and private organizations except for medical information, which will be provided to the individual via his physician.

Other exceptions have been included for files involving defense and national security, the bill said.

Subjective information, such as religious and political beliefs as well as racial origins, will not be permitted to be included in such files under the proposed law and police would be the only sector with access to criminal records. Manual files are not covered by the bill.

Individuals who violate the law could face prison sentences of up to five years and fines of up to two million francs ($400,000), according to French Minister of Justice Jean Lecaneut, who stressed that the bill is in no way intended to stifle the DP industry.

FEC and NBS to Host Election Symposium

GAITHERSBURG, Md. – The Federal Election Commission (FEC) and the National Bureau of Standards (NBS) will host a one-day symposium on the use of computers in the elections process on September 10.

The program includes an overview of the status of computerized elections in 1976, a live demonstration of various voting equipment and a choice of two two-hour tutorial sessions on the following subjects:

- Cost, obtaining expertise and public acceptance.
- Conducting a computerized election.
- Training, equipment malfunctions and scheduling services, supplies services and personnel.
- Contracting for computer services.
- Efficiency, security and accuracy.
- Computers in voter registration.
- Computer programs for vote tallying.
- Technology trends: use of minicomputers, voting by phone, automated identification of voters.

For additional details contact Mrs. Elaine Frye at (301) 921-3155.

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Maryland DP Professors Refuse To Participate in Exchange Plan

COLLEGE PARK, Md. – Computer scientists are among those at the University of Maryland here who have stated they would refuse to receive Soviet scientists participating in an international exchange program until the Soviet Union exhibits a willingness to live up to the principles of free scientific exchange.

In a letter to the executive director of the International Research and Exchanges Board (Irex), the chairman of the departments of computer science, physics, chemistry, geochemistry, mathematics and the Institute for Fluid Dynamics denounced the Soviet government's policy on scientific exchange.

Irex coordinates international exchange programs for scientists.

The letter cited the case of Prof. Benjamin Levich, a member of the USSR Academy of Sciences, who has repeatedly been denied permission to emigrate to Israel and now to teach at the University of Maryland's physics department.

The university's ban on participation in the Irex program excludes those Soviets specifically invited by colleagues at Maryland.

The letter complained scientists authorized by the USSR to participate in the exchange were not those invited by the university, but rather those selected by the Soviet government.

Were Levich allowed to visit the university, the six department chairmen would consider it a demonstration of true interest in free exchange on the part of the USSR, they said.

System Turns Papers Into Braille

WAUSAU, Wis. Bus schedules, telephone directories, reference works and study aids for school are now being provided in Braille for blind people thanks to a computer at North Central Technical Institute (NCTI) here.

The Braille Print Center at NCTI uses an IBM 370/115 to prepare any document a visually impaired person needs. The system produces a page of Braille in six seconds, according to Dr. Russell Paulsen, administrator of the research department.

The system can prepare Braille documents from a variety of source material, including typed copy, magnetic tape or punched cards, which is entered into the system to produce documents in Grade II Braille, a form of Braille similar to shorthand.

The system also accepts material prepared and edited via a CRT.

The computer edits the information into the proper format and produces it on a printer modified to handle Braille.

"We are offering this service to visually impaired people across the nation," Paulsen said. "These people need certain documents on the job that sighted people take for granted.

"Only about 1% of the material printed manually is ever put into a form visually impaired readers can use. Much of it could easily be printed in Braille by a computer. This includes documents prepared by the Government Printing Office and college libraries," he said.

To develop the Braille Print Center, the school obtained funds under the federal Vocational Education Act of 1968 and from a grant from the Wisconsin Board of Vocational, Technical and Adult Education.

Compcon Set to Open Next Week in D.C.

WASHINGTON, D.C. – Compcon 76 Fall, the IEEE Computer Society conference to be held here Sept. 8-10, will be oriented toward system engineering and offering practical solutions to real problems, IEEE said.

There are two preconference tutorials planned for Sept. 7. "Designing with Microprocessors: A Hands-On Workshop" will permit attendees to solve design problems in a variety of microprocessors using actual hardware. The other tutorial will explore structured programming.

The conference will open Sept. 8 with a plenary address by Walter W. Galvin, chairman of the board of directors at Motorola, Inc.

Technical sessions for the conference will be organized into five categories: computer applications, microprocessors, computer system technology, software and components technology and memories.

Under the computer applications group, energy systems, law enforcement systems and computers in education will be covered. The architecture, software, applications and design aids of microprocessors will be examined under this group.

Computer system technology will include sessions on security, practical applications of performance evaluation, innovations in system architecture, distributed systems and networks and problem partitioning for distributed systems.

Subjects to be discussed under the software sessions will include software design methodology, software cost estimating and sizing, software visibility and control, and reliability and quality assurance.

Components technology and memories will cover advanced MOS components technology, state-of-the-art semiconductor memory technology and advanced solid-state memory technology.

Also included in the conference program will be a series of "Great Debates" on centralized vs. distributed processing and the limits of software reliability.

For further information, contact IEEE Computer Society, P.O. Box 639, Silver Spring, Md. 20901.

Security Workshops Slated

PHOENIX – Honeywell will continue its workshops on computer security and privacy with four sessions here this fall.

The three-day workshops are scheduled for Sept. 28-30, Oct. 19-21, Nov. 16-18 and Dec. 7-9, according to Jerome Lobel, Honeywell computer security manager and organizer of the sessions.

Participants will examine actual cases of breaches of security or privacy in major DP installations, he said.

The registration fee for each workshop is $350. Additional details are available from Lobel at Honeywell, P.O. Box 6000, Phoenix, Ariz. 85005.

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Moss Charges LEAA Grant Requests Illegally Reviewed

By Nancy French

Of the CW Staff

WASHINGTON, D.C. – Grant applications for state and local criminal justice information systems submitted to the Law Enforcement Assistance Administration (LEAA) are routinely reviewed by Justice Department officials – including the Federal Bureau of Investigation (FBI) – in violation of federal law.

This was made public by Rep. John F. Moss (D-Calif.), chairman of the Oversight and Investigation Subcommittee of the House Interstate and Foreign Commerce Committee.

Moss believes this review amounts to "de facto veto power" and raises questions of "privacy invasion, intrusion into state and local jurisdictional bounds," and implications of "a nationwide police force." The practice should be stopped, he said.

The review violates the Omnibus Crime Control and Safe Streets Act, which states "functions, powers and duties assigned to LEAA shall not be transferred elsewhere in the Department of Justice unless specifically authorized by the Congress," Moss told U.S. Attorney General Edward H. Levi in a letter dated June 17.

It also violates a section of the U.S. Code which forbids any federal department, agency, officer or employee to direct, supervise or control any state police force, law enforcement agency or criminal justice agency, according to Moss.

Moss emphasized his point by citing a three-judge panel's opinion in Hiram B. Ely et al vs. Richard W. Velde handed down November 8, 1971.

In that opinion Senior Circuit Judge Simon E. Sobeloff noted Congress' wish to guard against federalization of local police and law enforcement agencies.

Quoting from remarks made during the debate over legislation enacting LEAA, Sobeloff said Congress believed federalizing local law enforcement agencies "would be less efficient than allowing local law enforcement officials to coordinate their states' overall efforts to meet unique local problems and conditions."

But "even more important than Congress' search for efficiency and expertise was its fear that overbroad federal control of state law enforcement could result in the creation of an Orwellian 'Federal Police Force,'" Sobeloff added.

The judge said further that the legislative history of the Omnibus Crime Control and Safe Streets Act reflects the congressional intent to shield the routine operations of local police forces from ongoing control by the Justice Department – a control which conceivably could turn the local police forces into an arm of the Federal government.

This law, which forbids federal control over local police and law enforcement agencies, was the congressional solution for these problems.

Moss told Levi federal DP and telecommunications policy and its implementation in all areas, including criminal justice, is by law the responsibility of Congress.

He said further he could understand delegating that responsibility to the Office of Management and Budget or to the Office of Telecommunications Policy. However, delegating that responsibility elsewhere within the Justice Department "leaves the concerned American with the crucial question of why the FBI and other related agencies are involved in this vital process.

"The inescapable conclusion is that these entities are deliberately involved to shape to their own image all criminal justice operations, down to the state and local level," Moss said.

WASHINGTON, D.C. – State and local grant requests which various Justice Department committees reviewed prior to funding by the Law Enforcement Assistance Administration (LEAA) in apparent violation of federal law include a number of key DP and telecommunications systems, LEAA Administrator Richard W. Velde told Rep. John E. Moss (D-Calif.) in a recent letter.

These grants included:

- Upgrade of National Law Enforcement Telecommunications System (Nlets) Phase II.
- Upgrade of Nlets Phase III.
- Implementation of Interstate Organized Crime Index.
- Demonstration project, state-level computer-assisted latent fingerprint identification system.
- Low-cost, high-resolution facsimile transceiver.

In addition, all discretionary grant applications for operation of organized crime and corruption control project were reviewed by Justice's Criminal Division's Organized Crime Records Section, the Federal Bureau of Investigation and the Drug Enforcement Administration.

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Computerworld

Ohio Joins CCH

WASHINGTON, D.C. – Ohio has become the ninth state to begin entering and updating computerized criminal records in the National Crime Information Center's Computerized Criminal History (NCIC/CCH) system.

Other states fully participating in the Federal Bureau of Investigation's NCIC/CCH are Arizona, California, Florida, Illinois, Michigan, Nebraska, North Carolina and Virginia. The District of Columbia is also a participant.

Cartoons Reflect Public's Feelings About DP

By E. Drake Lundell Jr.

Of the CW Staff

NEW YORK – The study of humor is often a good way to gauge people's real feelings about a subject, so a sociologist from the University of Minnesota rolled out a sample of his 500 cartoons dealing with computers to show DPers how they are viewed in that popular art form.

Cartoons often depend on stereotypes for their humor, and those stereotypes do have at least elements of truth, Ronald Anderson said at a recent conference here. They certainly reflect the viewpoint of the general public toward a subject, he added.

Almost all of the humor about DP reflects the general public's frustrations dealing with computer systems and computer people, he said.

In addition, the majority of the cartoons reflects a great deal of ambivalence on the part of the general public when it comes to the area of computers; people generally have very positive feelings about computer systems, he said, but at the same time also hold some very negative opinions.

A thematic analysis of the cartoons covering the computer field and computer use over the last 25 years shows some major predominant themes, he said.

Dehumanizing Force

First, there are a large number of cartoons that depict the computer as a dehumanizing force. These take two major tacks – some show the people who work with computers as machine-like, others show the machines controlling society, Anderson explained.

A second major theme running through the cartoons is the humanization of computer systems, where the humor is dependent upon the feeling that the computer system really has human attributes, he said. These anthropomorphic cartoons depend entirely on the responding human for humor.

Another major grouping deals with technological tyranny, Anderson said, noting this is the most prolific theme running through the cartoons. These often deal with such issues as unemployment because of automation or show people chained to a computer system in one way or another, he said.

On the other hand, there is also a group of cartoons that basically illustrates the computer's dependence on people, which is somewhat the reverse of the technological tyranny grouping, he indicated.

These cartoons often show the computer system out of operation because someone forgot to plug it in, he said.

MIT Study Finds DP Could Speed Paper Routes

CAMBRIDGE, Mass. – Only through a computerized approach can all the many variables that enter into a sound routing policy be taken into account, according to an MIT research team here.

The team, which investigated computerized scheduling and routing of newspaper delivery trucks, came to the conclusion that computerized approaches to scheduling and routing of delivery trucks "should be part of the future electronic environment" of newspaper plants.

In order to conduct the study in a real-world environment, the researchers worked with staff at the *Worcester Telegram-Gazette*, an afternoon newspaper, to assess the requirements of its distribution system.

The investigators devised a model that considered limitations on the vehicle loading capacities, the maximum number of drop points that can be assigned to any route, the maximum time that should be allotted to any vehicle's route and the size of the delivery fleet.

They then applied the model to data provided by the *Telegram*. This data included listings of vehicle routes within the city limits, information concerning the approximately 500 drop points for bulk deliveries and information about the numbers and sizes of delivery vehicles.

Tentative conclusions of the modeling showed the 550 drop points within the city can be covered by a total of 13 routes rather than the current 20; a routing concept entirely different from the one in use is possible; and vehicle can be loaded to more than 50% of functional capability, averaging 67% capacity.

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Editorial

Moving Forward

Terminal Aiding in Search
For 'Legion Disease' Cause

Belle Tests Network's Ability
To Reduce Destruction by Flood

System Monitoring Whereabouts
Of Delegates at GOP Convention

All three of those were headlines on the front page of just one recent issue of *Computerworld* [Aug. 16].

And all three show clearly computers are being used for more projects in service to man than ever before – from searching for clues to mysterious diseases to alleviating flood damage to keeping better track of large bodies of people.

All are applications that are clearly designed to help people and as such deserve a great deal of recognition.

Too often the only stories one hears about computers are the "horror" stories where a person is dunned for a nonexistent bill or someone's privacy is invaded or otherwise threatened by data – often erroneous – that is contained in a massive data base.

This is particularly true in the general consumer press, where often the only stories about computer systems are about systems that fail or work poorly.

Of course the press is not at fault entirely; rather, it mirrors people's conceptions and perceptions about computer systems.

Most people feel somehow threatened by computers – they still believe in the stories of the "all-powerful brain" that were used to describe computers in their infancy.

Because of this threat, they like stories about the systems failing or about systems that have to be saved from massive errors by last-minute human intervention.

So the horror and scare stories predominate – stories about computers in successful applications or in service to mankind go uncovered or are downplayed. But there are as many good stories about how computers actually help man as there are stories about computers as a threat – if not many more.

Everyone in the computer community has a responsibility to try to get the general press and the general public to see this side of computer systems. Users and vendors alike should make their local papers aware of these developments.

The vendors, which generally have large public relations budgets, obviously should bear the largest part of the burden. Instead of just inundating the press about the activities of their specific companies, they should take it upon themselves to help promote the good or socially useful side of computers to the public.

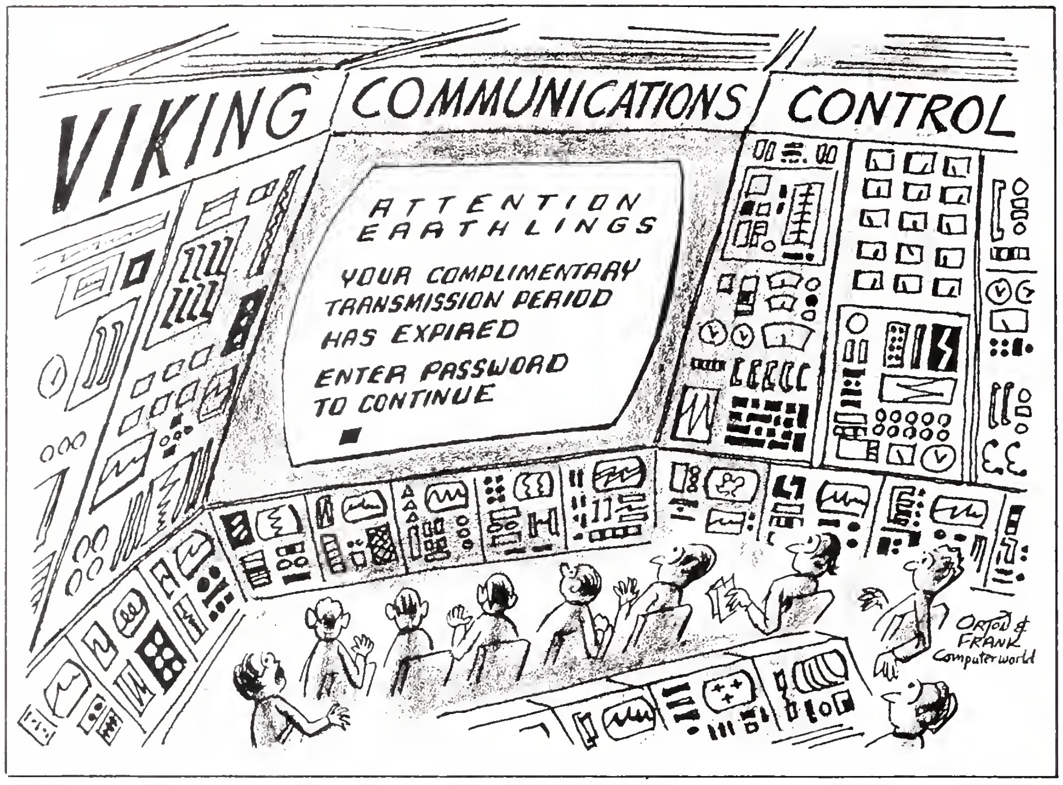
But users can also play a role – either as individuals or through their organizations.

Obviously organizations can inform the press and public about specific programs they are undertaking that will improve service to the general public or aid consumers in any way.

The individual, however, should be alert to distorted and misleading stories in the news and bring such stories to the attention of the editor of that publication. Done in a constructive way, this may pique an editor's interest about the field and lead to better and more accurate coverage in the future.

It is important to change people's perceptions about computer systems because in the future many of our systems will have a greater effect on consumers and the general public than they do today. If there is a great deal of resistance on the part of the consumer, it will be more difficult to implement those systems.

And, besides, there are a lot of good stories that need to be told.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Computerworld

Letters to the Editor

Creative Programming Must Aim At Easily Maintainable Programs

Regarding Anita Benson's letter on "A Plea for Creative Programming" [CW, Aug. 16]: Creativity is a people trait; structure is a machine trait. Blending these two disparate qualities is the challenge of creative computing.

The creative aspect of computer science is not obsolete, but don't confuse creativity with unorganized (dare I say unstructured?) randomness. If you think creativity is in contradiction with the Kiss [Keep It Simple, Stupid] rule, then that creativity is obsolete.

If you think creativity means even the simplest program takes two weeks to read, three more to understand and another four to modify, then that creativity is obsolete also.

If you think creativity is naming a data structure after Snow White's seven dwarfs, that creativity always has been obsolete.

Standards are not restrictions; they are building blocks to be rearranged and used creatively. If Benson feels threatened by "standards and restrictions creeping up," I suggest she redo her M.A. in math – but this time without the standards like Peano's axiom, the mean value theorem and Euclidean geometry and without the structure of inductive logic.

Furniture may "last for a lifetime and be a joy to use," but software will probably change every year and it had better be a joy to rewrite.

James M. Brown
Justice, Ill.

Basic Seen as Artist's Language

In reply to Anita Benson's plea for creative programming, I feel it's interesting programs for interesting problems that has crippled the professional stature she so wishes to attain.

Structured programming was designed to provide easier maintenance, modularity and adaptability to critical path method (CPM) and program evaluation and review technique (Pert) analysis.

The idea that a program is so well structured it will last a lifetime is applicable only in the creation of games. Business' and industry's use of computers is always changing.

I agree computer programming is still an art, but I feel Basic is the language for the artist. Hobbyists are growing in large numbers to create a "masterpiece" in Basic on their Imsai or Altair microcomputers.

Dave Myster
Chico, Calif.

The Problem of Modification

Anita Benson's letter hit on a more serious issue: What is the relationship of creativity to programming? I would suggest that any creativity must fall within the general framework of the task of producing correct and modifiable systems.

Standards and restrictions, which Benson found "creeping up" on her, can be misused but should be – and usually are – aimed at ensuring the modifiability and maintainability of the code. There is much room for creativity within this framework and within these standards: creative design of program structure, creative algorithms, creative date structures and creative testing procedures.

There is, however, a possible problem with the kind of hand-crafted masterpiece which Benson would like every program to emulate – nobody but the original master can repair or improve it. It would be creative to build and a joy to use – an efficient working system which even the most junior programmer can maintain.

Dennis P. Geller
Burlington, Vt.

Data Past

Five Years Ago
September 1, 1971

HACKENSACK, N.J. – Benchmarks run on an IBM 360/65 indicated the Synchsort disk sort package introduced by Whitlow Computer Systems, Inc. took about half the time of IBM's OS-based SM1 or SM-023 sort/merge packages.

WASHINGTON, D.C. – The Federal Bureau of Investigation announced its plans for opening a computerized National Criminal History System the following November, despite continuing controversy and the temporary refusal of at least one state to participate in the program.

Eight Years Ago
August 28, 1968

WASHINGTON, D.C. – A full House Committee on Government Operations approved a report which placed the computer community in indirect charge of a National Data Bank with a requirement to guarantee "the high-speed information handling does not contain a toxic which will kill [individual] privacy." The committee report stated its views and recommendations were also applicable to the structure of any data system which permits unified or central review of diverse information on individuals.

MINNEAPOLIS – Control Data Corp. agreed to merge with Commercial Credit Co., a large independent finance company. The merger was seen as making partners of CDC and RCA – competitors in the computer manufacturing field – because of a previous move by RCA and Commercial Credit to operate cooperative computer centers in the U.S.

Another Establishment

I rail with perhaps boring frequency about various Establishments in and around our trade: the ACM old-timers, the grungy top management of the main IEEE, the credit and personal information cabal, the Big Science advocates. Let me call your attention again to a *real* Establishment, in a country notorious for such things, and to an action so blatant as to have aroused even the long-suffering indigines. The story has already been carried in these pages [*per* Joe Hanlon, CW, Aug. 9], but I have a yarn to spin.

The Establishment concerned is that underlayment of lesser appointees and permanent civil servants known as "Whitehall," the inaction arm of the British government. On top are public figures: the Harold Wilsons and Tony Benns. But right below, doing most of the detailed damage, are people who correspond to our Assistant Secretaries and Deputy Thingamabobs and supergrades. Stuffier than ours, if such a thing is conceivable, and equally amazed at public rebellion.

Some years ago – yes, years – the UK government appointed a pretty good committee, chaired by the late Sir Kenneth Younger, to report on the problems of computers and privacy. After a delay so long as to produce suspicious complaints from the trade press, the professional society (the British, lucky for once, only have one!), and even the data processing user community, the Government produced last December a White Paper on the matter. White Papers are the far, far more readable equivalent of publication in the Federal Register: an announcement of proposed actions which will affect a sector of the economy, or consumers, or whatever. This particular one announced that the Home Office would set up a Data Protection Authority, to enforce many of the principles enunciated in the Younger report.

Now, the Home Office is not exactly the best possible outfit to foster such activity. Unlike our Department of Interior, it runs Scotland Yard, a constabulary much better thought of outside England than our FBI now is, but still not *quite* as pure as the driven snow. Cops are natural enemies of privacy – everywhere.

Well, the Home Secretary has just announced the makeup of the Data Protection Committee – mostly ignorant, mostly subservient, plus a few wrong-side boys whose money or plans are threatened. Not one computer professional in the lot; the British Computer Society, which had offered assistance, is outraged. Ah, but there is one industry chap – and thereby hangs a tale.

I was the featured speaker four years ago, while still at the Bureau of Standards, at a meeting in Dublin. This was about the time privacy was heating up, and I was asked to discuss it. The Grim Gray Giant, hearing of this as it hears of everything, first decided to ship Bob Courtney over from Armonk as an antidote, or at least a palliative. Economy prevailed however; I was a shelf item at NBS at the time, not a First Class Threat. So a local was dispatched – but what a local! His name was John Hargreaves, and he was a top PR man in IBM UK. He was just perfect – really believed what he had to say, which was that IBM was deeply concerned, was working vigorously in both the technical and the social sides of the security-privacy field, would be a good corporate citizen.

And he was beautiful: had been in Military Intelligence (MI) during the war, then the Foreign Office, wore bespoke shoes, probably John Lobb, a magnificent Savile Row suit – and he quoted Wordsworth, at length, from memory. Boy, did I feel grubby! Actually, he was so super he put the Irish off, and I got to do the better TV spot later.

[illegible] for IBM in London [illegible] Data Pro[illegible] [illegible] DPC [illegible] Knower [illegible] cloak-and-dagger [illegible] full dagger [illegible]

Among [illegible] Readers [illegible] and Times [illegible] get once [illegible] Harg[illegible] [illegible]

But [illegible]
From IBM [illegible]
[illegible]
No doubt [illegible] lines would [illegible]

[illegible]
[illegible]
[illegible] watch him. Words worth [illegible]

Herb Grosch

Instructions for Three-Digit Edits Must Be Detailed

The Taylor Report

By

Alan Taylor, CDP

One of the standard problems in data processing is unexpected input that gets into a program and causes occasional havoc. Not everything goes wrong with all input, but everything about one specific piece of input appears to go wrong.

What has probably happened is that the edit process was not performed properly. So we should blame the programmer, shouldn't we?

More likely we should blame the person who gave out the specifications for the job to be performed.

Here is a little test for you and for your compiler. Imagine a route code, defined as a three-digit numeric. How many of the following eight examples should pass?

Route Code	Should Pass	Would Pass Compiler If Numeric
123		
000		
1bb		
bb1		
123 With 12-Zone Overpunch		
+12		
-34		
121 With 11-Zone Overpunch		

By the time you have filled in this table, you will have found just how inadequate that original three-digit numeric route-code definition really was.

This test was devised by R.D. Gates, a project manager for McDonnell Douglas Automation Co. in Long Beach, Calif. Gates, however, went further than simply showing the problems. He proceeded to analyze both the problem and the size of the task involved in doing it properly.

Looking at the problem, the first step that can be tackled is a proper handling of the sign situation. If the specification is clarified, the last four entries which have explicit or overpunch signs would fall. This is a simple case.

More complex is the case where some sign is permitted. Here the detail of how it is to be represented must be given. And the whole question of whether the sign is to be required or optional must also be fully specified.

Analyst Specs Too

The problem of blanks adds further complexity. Today there is a trend to allow leading blanks, as in bb1, to pass the edit, but to change their form into 001. Simple enough in itself, but again something over and above the actual inspection task. It has to be kept in mind in the definition, not by the specifier but by the analyst. These are analyst specs, not user ones. They still need documenting.

Allowing leading blanks, however, does not normally permit trailing blanks which under this philosophy are rejected.

If, as sometimes happens, trailing blanks are permitted, defining whether bb1 is to be accepted as 100 or as 001 is required. It can make a difference.

Zero Value Problems

Blank editing can be connected with zero-editing situations also. If blanks are acceptable and if zero-value entries are used, what is the difference between a blank field and a zero-filled one? Does the situation change in the case of leading and/or trailing blanks? More questions waiting for more answers.

Possible Edit Conditions	Data To Be Edited				
	123	12C*	+12	-34	12J*
Any Sign Permitted	Y	Y	Y	Y	Y
Overpunched Signs Permitted	Y	Y	N	N	Y
Leading Signs Permitted	Y	N	Y	Y	N
Negative-Only Signs Permitted	Y	N	N	Y	Y
Positive-Only Signs Permitted	Y	Y	Y	N	N
Overpunched Negative Signs Permitted	Y	N	N	N	Y
Leading Negative Signs Permitted	Y	N	N	Y	N
Overpunched Positive Signs Permitted	Y	Y	N	N	N
Leading Positive Signs Permitted	Y	N	Y	N	N
No Signs Permitted	Y	N	N	N	N
Sign Required	N	Y	Y	Y	Y
Overpunched Sign Required	N	Y	N	N	Y
Leading Sign Required	N	N	Y	Y	N
Negative Sign Required	N	N	N	Y	Y
Positive Sign Required	N	Y	Y	N	N
Overpunch Negative Required	N	N	N	N	Y
Leading Negative Required	N	N	N	Y	N
Overpunch Positive Required	N	Y	N	N	N
Leading Positive Required	N	N	Y	N	N

* Indicates overpunched character
Y Acceptable Data
N Rejected Data

The above table shows the 95 different answers needed to define the edit handling of signs for different data fields.

To attack the problem, Gates used a chart as a handy one-page definition that quickly brings everyone to a common understanding. A reduced version of the chart is shown in the accompanying box together with the 19 items of definition he found are involved in even a simple edit.

The chart shows the same possible data entry fields used in the test given earlier and defines whether they would be accepted or rejected. The table can be expanded to treat the zero and blank problems if desired. These, however, are generally capable of being treated with a quick written definition.

This situation is [illegible] by the "[illegible]" test, which will accept some and reject others. Where such tests are to be made, it is particularly necessary to identify handling of the entire possible spectrum and to provide test data to ensure the program picks up the right [illegible]. Installation standards are [illegible] here.

[illegible] level of attention.

So installation standards [illegible] worth considering [illegible] the problem and then [illegible] specifier for not saying [illegible] is no answer at all.

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DPers Must Make Themselves Professionals

. . . And in This Corner

By Kenniston W. Lord Jr.
Special to Computerworld

There has been perhaps no single issue more clouded in our industry's 25 year history than the basic question of whether those persons who practice DP do, in fact, constitute a profession.

On the one hand, there have been those moralists who have gone to great length to equate the term to something closely analogous to the Golden Rule or the Ten Commandments.

On the other, there are those who equally convincingly state that professionalism is as professionalism does and that such attributes are as much a function of knowledge and experience as they are of the loosely defined virtues of honesty and morality.

An entirely differing authority would have us believe "professionalism" is a function of whether the U.S. Department of Labor classifies us as salary exempt or nonexempt or whether the employer has determined if a given salary range or job classification contributes to organizational profit in more than an ordinary manner.

Added to that is a recent court decision which has decided that a certain classification of our people are *not* professional and are therefore entitled to compensation for services beyond the normal duty period [CW, Feb. 9]. It is entirely possible that firms may be facing such backward compensation in a grand scale, for some DP practitioners will relate tales which could put descriptions of slave labor to shame.

Perhaps when DP practitioners awaken to the fact that they could exert such pressures were they to organize as a class, that will come about. At that time, the firms in question will begin, in a big way, to promote the traditional attributes of professionalism – mandatory people standards, mandatory and uniform educational standards, peer evaluation mechanisms, legal sanctions for the people and legal control over the products which the people produce.

Such moves are, in many ways, desirable right now, for they carry with them the concommitant requirements of accountability and responsibility. But more importantly, those requirements, when established by the DP community itself, will perhaps be the first step toward making the practice of DP what many of us feel it should be – a profession.

The interesting thing, however, is that we may not be able to wait until the industry itself begins to move. Such accountability and responsibility may be imposed upon us by our demonstrated irresponsibility toward the impact of the systems we develop upon the public at large. Sooner or later, just one too many of that public is going to be disadvantaged, incapacitated or killed, and the groundswell will begin. A sophisticated populace will demand recourse from an increasingly sophisticated Congress and then, all of sudden, accountability and responsibility will become a mandate of law rather than a mandate of choice.

Indeed, accountability and responsibility begins with those who are willing to accept it, and a wholesale program of such acceptance with demonstrable evidence of it, presented in a convincing way to the public, would at once be useful.

Such an approach is, indeed, desirable – but not very realistic. The minority of us who are not touched by apathy see the only commitment to our "profession" by many DPers is a single hour – meal and entertainment – spent at the local chapter of the Data Processing Chowder and Marching Society.

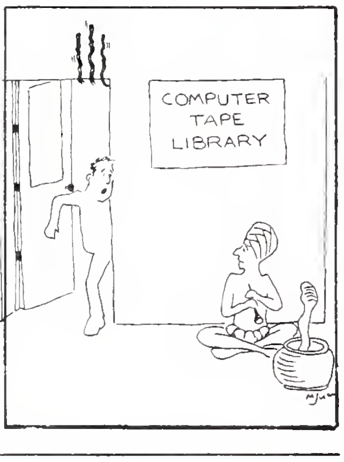
Unfortunately, such benign neglect is far from satisfactory. What is needed is an organized activity to produce such a structure and to produce it quickly and effectively, for the alternative is crystal clear: either we do it – you and I – or we wait until the game of brinksmanship has been played to its climax, laying disadvantage, harm and death in its wake.

Traditionally one would expect that it would be the function of the various societies to perform such duties. But it is simply not in their interests, individually or collectively, to rock the boat.

The movement, if it is to be made by us and not by legislators, must begin with you and me and must be a threefold process: (1) open acceptance, at the personal level, of such responsibility and accountability; (2) open, frank and directive discussion in the pages of the media and monthly social gatherings; (3) the application of pressure on the professional organizations and legislators to indicate the problem is indeed real and requires resolution.

You want this to be a profession? It must begin with you. You've got to prepare for it, accept it, demand it. Yes, you may outlive the problem.

And then again, you may not.



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[illegible] report generator program that lets you [illegible]

[illegible] hardware monitor capability [illegible] paging and device Activity are plotted by a graph generator [illegible] graphs that measure overall computer performance and spotlight over- and under-utilized equipment.

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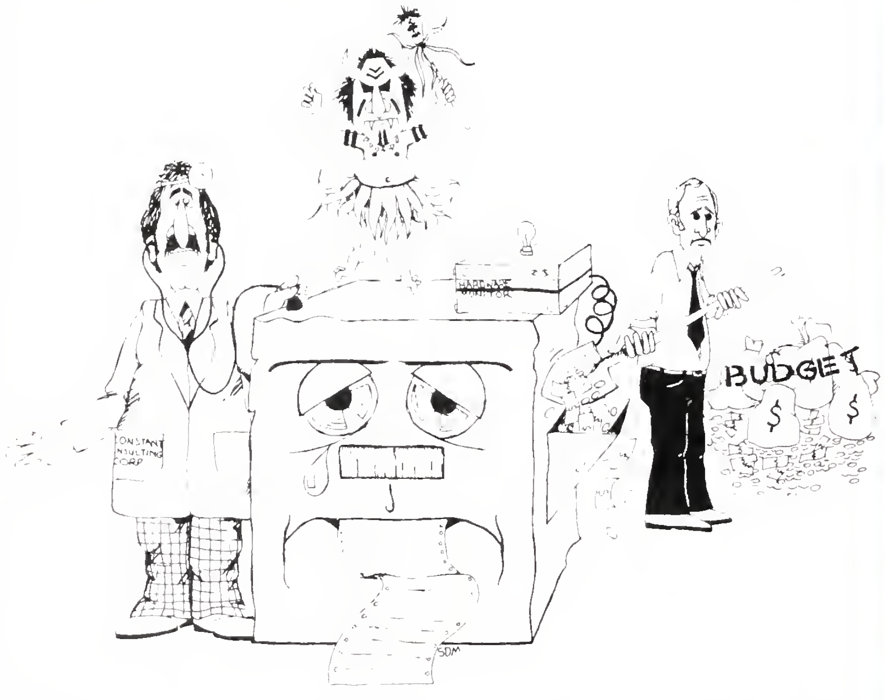

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U.S.-European Ties Still in Place

Ansi OKs, Ecma Defers Acceptance of PL/I Standard

By Don Leavitt
Of the CW Staff

NEW YORK – PL/I has officially become a standardized language – but only in this country.

The American National Standards Institute (Ansi) completed the last of its approval cycles of the proposed standard earlier this month.

Designated X3.53-1976, the standard should be ready for distribution this autumn, but it is too early to know how large the book will be or how much it will cost, according to an Ansi spokeswomen.

The dream of having PL/I the first programming language to be formally standardized in the U.S. and Europe concurrently failed to become reality, however. At a meeting last month in Geneva, the European Computer Manufacturers Association (Ecma) officially delayed its acceptance of the proposed standard until at least December.

Setback Not Serious

Ecma's "deferment of acceptance" is not a serious setback for the ultimate approval of the standard by the Europeans, according to John Kuoni, vice-chairman of the Ansi X3J1 committee that worked up the draft standard for the U.S. DP community.

Liaison work between X3J1 and the Ecma technical committee is continuing, he said, emphasizing his group wants to do anything it can to help gain acceptance of the standard by Ecma.

The draft proposed standard was first made available for public comment in April 1975. At that time, X3J1 chairwoman Lois Frampton acknowledged the proposed text was quite different in format from earlier standards for, as an example, Cobol.

The Cobol standard generally defined the elements of that language, including options, and illustrated what they meant from the user's standpoint. The PL/I proposal, now the standard, describes what an implementor has to do to make the elements of the language do what the user expects.

Ecma's delay in approving the standard seems almost an echo of the Ansi situation, although the European "deferment" is more formal than the American delay.

Nonetheless, Ansi's X3 secretary Robert Brown estimated a year ago [CW, Aug. 20, 1975] that Ansi's work should be complete before the end of that year.

Root of Hesitation

The European technical press does not seem to take the Ecma delay as a serious problem. The UK's *Computer Weekly*, for example, noted recently that practical problems of implementation and some concern over what governments might do if they were "equipped with an Ecma-endorsed standard" seemed to be at the root of Ecma's hesitation.

While a number of American manufacturers have implemented PL/I successfully, the paper noted that International Computers Ltd. in particular "has long considered a PE/I implementation but rejected it on technical grounds."

With a standard available to them, governments "would be tempted to make PL/I compulsory" for government projects, according to another view of the problem. This would be a "considerable embarrassment" to any manufacturers with machines on which PL/I is difficult to implement, *Computer Weekly* said.

Since the U.S. government has already committed itself to use of Cobol as a Federal Information Processing Standard, that concern was not a factor in Ansi's considerations.

Started at IBM

PL/I was first publicly discussed in 1964 when IBM introduced its concepts – the idea of a systems language and not just a programming tool – under the name "New Programming Language." Its abbreviated form, NPL, conflicted with another language already on the scene, so IBM changed the name to Programming Language/I.

Almost exclusively an IBM 360-oriented language during its early development, PL/I has been implemented in various ways by a number of groups working with numerous mainframes and minis in the past half-dozen years.

Standardization efforts started under Ansi's predecessor, the United States of America Standards Institute, in the late 1960s. That apparently was too early; a more informal group of users and implementors met and swapped ideas over the next few years just to clear up details, including agreement that the designation should be PL/I (with a Roman I and not a numeric 1).

The groundwork done by that group led directly into the formalized Ansi-Ecma standardization effort, release of the proposed standard in 1975 and approval in 1976.

'DMS/OS' Developed to Control Data Sets, Use of DASD Space

SACRAMENTO, Calif. – The proliferation of data sets being placed on direct access storage devices (DASD) and the increasing capacity of the devices themselves led to development of DASD Management System (DMS/OS), according to its vendor, Software Module Marketing (SMM).

Compatible with IBM's OS and OS/VS environments, DMS/OS provides data set retention control, selective dump/restore facilities and archiving of user-designated files, SMM said.

A volume configurator to optimize DASD space and a number of management-level and technical reports are also part of the package, a spokesman noted.

Separately priced modules support user billing for DASD space and interfacing with a teleprocessing environment, he added.

Automatic scratching of data sets is accomplished through the retention control component, which is governed by the expiration date field in the data set control block, scratch exclusion tables, scratch candidate file contents or the catalog status, he said.

Selective dump/restore and archiving have a number of similarities, the spokesman acknowledged, but noted their basic purposes – protection of regularly used files in the first case, storage of seldom used files on less expensive media in the second – require separate modules to handle these tasks effectively.

The volume configurator facility handles the distribution of data sets and free space across a disk pack, eliminating much of the clerical effort usually associated with the layout and planning of DASD space use, SMM said.

It can be used with new volumes containing only the Volume Table of Contents (Vtoc) or with existing volumes, which may need reorganization to achieve desired goals; a set of utilities are included to help resolve any such conflicts, the spokesman added.

The package is driven by tables wherever function controls can be parameterized. Fields in DSCBs as well as internal data elements are defined in tables, the vendor said. Report formats are managed through tables as well, the spokesman added.

The basic DMS/OS costs $8,900 while the user billing modules are an extra $1,200. The teleprocessing interface module – including IMS/TP – costs $1,500, SMM said from the Crocker Bank Bldg. Penthouse, 1007 7th St., Sacramento, Calif. 95814.

NCSS Extends Analysis Of Electronic Circuits

NORWALK, Conn. – A newly released version of Ispice, an interactive program to simulate and analyze electronic circuits, is now available on the National CSS, Inc. (NCSS) remote-computing network.

The scope of the system is such that circuits "containing a virtually unlimited number of components" may be simulated in a single operation, NCSS said from 542 Westport Ave., Norwalk, Conn. 06851.

Package Aids Datapoint Planner

MONTEREY, Calif. – Dataflow from SCM-Plex Corp. is described as a syntax analysis system for Datapoint equipment users which scans a Databus or Datashare source program and produces flowcharts, program diagnostics and related cross-references.

Input to the system is a Databus/Datashare program in the same general form that would be presented to the DBCMP compiler, the vendor said.

Depending on the operating system used, the input may be on diskette, cartridge disk or mass storage disk packs, a spokesman added.

Called for execution like any other Databus/Datashare program, Dataflow performs statement analysis, allocates procedures to pages for printout and references the last entry point by line, page and inclusion.

In addition it details condition codes that could be set by any "opcode" – by line, instruction, inclusion and page, according to the spokesman.

Dataflow draws all logical symbols, identifies the locations of referencing labels at the point referenced and supplies all traps set during any disk I/O, he continued.

The flowcharts are produced in the same order as the source statements are written. This preserves the integrity of the source language and makes it "quite convenient" to use the flowcharts side-by-side with a compiled listing, the spokesman added.

The output is said to conform to American National Standards Institute (ANSI) flowcharting.

Dataflow is available for $500 on a one-year license. It is also available with a spooler for $750, the vendor said from 161 San Bernabe Drive, Monterey, Calif. 93940.

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File Keys, Names Matched

WOODLAND HILLS, Calif. – The Data-Index package from Case, Wachter & Associates Inc. was designed to bridge the gap between the name commonly used for a person, place or thing and the number under which it may be filed in any given data system.

This capability should solve the problem caused by the fact that most data files are kept in sequence by some numerical key – such as policy, account or part number – while users and customers generally think in terms of names rather than numbers, the vendor said.

Intended for either on-line or batch use on IBM 360/370 mainframes with almost any of the disk subsystems commonly available, Data-Index allows the user to enter a name and to get back the appropriate number so the file can be accessed effectively, according to a spokesman.

The software has the ability to conduct "phonetic searches" in which it produces a listing of all number keys that might relate to a name; this is particularly useful, the vendor noted, when inquiries come in by telephone and the terminal operator may not be completely sure of the name being spoken at the other end of the line.

Use of Data-Index imposes no programming changes on the installation's application programs.

Available in both DOS and OS, the system utilizes IBM 2311, 2314, 3330 or 3340 disk drives.

Main memory requirements are 3K or 4K for on-line use up to a maximum of 25K for off-line OS use.

Data-Index is available for $4,500 from the vendor at Suite 243, 21243 Ventura Blvd., Woodland Hills, Calif. 91364.

Human Resources System on Net Combines Census, EEOC Data Use

NORWALK, Conn. – A human resources system designed to meet the reporting requirements and affirmative action programs of the Equal Employment Opportunity Commission (EEOC) is now available through the remote-computing facilities of National CSS, Inc (NCSS).

The system helps companies compare their hiring practices with local census information in order to keep up with EEOC Affirmative Action requirements, NCSS said.

In addition, the system is said to offer complete on-line personnel management capabilities.

The system "is believed to be unique," an NCSS spokesman noted, explaining "it can match user data with both the 1970 federal census data and the 1975 EEOC compliance data, broken down by location, industry and job type.

That combination of census data and EEOC data was described by NCSS as available only through the facilities of the network and of the interactive data base management system, Nomad.

The on-line capabilities give users the ability to see how their hiring practices compare with the demographics of their area and with other companies in the same industry in that area; that type of documentation is important in justifying affirmative action programs and avoiding litigation, NCSS added.

The Nomad-based system is said to provide user management access to a number of "parameter" figures by which personnel practices can be judged. These include the number of people living in a geographic location broken down by race, sex, etc. and the number of people employed in that area broken down by race.

Data is also provided to identify the number of people employed in an industry within that geographic location broken down by EEOC categories, the spokesman explained.

The NCSS service is available locally in most major metropolitan areas in the U.S. The company is headquartered at 542 Westport Ave., Norwalk, Conn. 06851.

Package Plans Tabs For Remote Printing

NEW YORK – Tableau from Bi-Hex Corp. analyzes computer printer images and determines the optimal locations for horizontal tab stops for users who want to communicate, spool or print the images on remote terminals, according to the vendor.

The product may be used in various ways in IBM 360/370 environments, ranging from a stand-alone tool for tab-feasibility testing to an "on-board" subroutine for automatic tab setting as new tasks are introduced, the company added.

Input to Tableau is a tape or disk data set comprised of the print images of the report to be analyzed; output is a single-page bar graph "which can be easily interpreted" in terms of cost and performance, a spokesman explained.

For fixed-tab equipment, the graph can predict the effects on network performance that such changes as new report formats or volume fluctuations will cause, he claimed. For more modern terminals with "firmware" tab stops, the graph can be used to optimize the tab-stop commands, he added.

Human intuition for setting tab stops "has its limitations," he argued, especially in the cases of mixed reports or irregular report formats.

Written in ANS Cobol with a called Assembly language subroutine for line scanning, Tableau requires a minimum 6K partition in any IBM 360/370 operating environment.

Source code, documentation and 90-day support are provided for $650, the company said from Suite 303E, 200 Park Ave., New York, N.Y. 10017.

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Debugging Easier, Too

With Current Tools, Even Cobol Can Be Used in GDP

By Richard J. Cichelli
And Martha J. Cichelli
Special to Computerworld

Concepts and Techniques

Goal-directed programming (GDP) is a technique of problem decomposition that leads naturally to top-down, structured program design and coding [CW, Aug. 2, 16].

At each step in the process a goal is identified, an assertion is made that will be satisfied when the goal is met and a logical condition is derived that can be tested in the program's control code.

How does GDP affect the testing and debugging process? Debugging can be the most time-consuming part of program development. Since goal-directed programs are structured, they share all the error-reducing benefits of structured code.

Additionally, in debugging a goal-directed program, the programmer systematically looks for unmet goals, unsatisfied assertions and untested conditions. Goal-directed reasoning helps in testing and localizing errors.

Documentation for goal-directed systems is more meaningful and less tedious to produce than for the typical system in the past. It takes the form of a narrative of the design process and presents an idealized version of the solution process.

It is important to remember the only real documentation of a system is its code. Even in-line comments should be suspect (after all, they aren't executed). Everything must be done to make the code readable. System documentation should be a designer's guide to the readable code.

Applicable to Big Projects

Is GDP applicable to large system design? In a large project, communication among design team members and between the team and the user client is facilitated by the explicit factoring of the project into functionally oriented goals.

At the team level, the project can be properly analyzed in terms of goals instead of being mapped into a possibly inappropriate personnel organization.

When users receive a statement of functionally specified goals and interact with the design team to refine these goals, then incremental implementation, availability and use of the system are possible. In this way users get some of the benefits of the new system even before it is completed, and the designers get the feedback of user experience while the design process is still under way.

A goal-directed presentation of the system design can be understood even by naive users and can make a synergistic relationship between designers/programmers and end users possible.

Influence of Language

What tools make GDP easier? The programmer's language has a tremendous influence not only on his coding style, but on the way he thinks about problems.

GDP depends on the facility to group statements into functions or blocks, each of which can be treated at any arbitrary level of nesting as a single statement. It is this statement-bracketing facility that makes it possible to replace any block (e.g., a single statement) with any other block (e.g., "IF condition THEN statement1 ELSE statement2") without disturbing the surrounding code.

When this is lacking in a programming language, top-down development by "stepwise refinement" and GDP become more difficult and time-consuming.

Languages like Pascal, C and Bliss are well suited for GDP (there is probably no language that offers as much data structuring capability as Pascal).

Neither Cobol nor Fortran is a block-structured language. Fortran is particularly deficient in control structures although some changes have been made to improve that [CW, Aug. 2].

Cobol gives the appearance of having the necessary structures (it has an IF-THEN-ELSE and the PERFORM-UNTIL seems a reasonable variation of the WHILE-DO), but they are lacking in several important respects.

Cobol's implementation of the IF-THEN-ELSE (with no statement bracketing) does not permit the arbitrary substitution of an IF-THEN-ELSE block for another block. For example, if

```
IF A THEN
  STATEMENT1
  STATEMENT2.
```

becomes

```
IF A THEN
  IF B THEN
    STATEMENT1A
  ELSE
    STATEMENT1B
  STATEMENT2.
```

the execution of "STATEMENT2" has been affected when it should not have been. With a statement bracketing facility,

```
IF A THEN
  STATEMENT1.
  STATEMENT2.
ENDIF
```

becomes

```
IF A THEN
  IF B THEN
    STATEMENT1A.
  ELSE
    STATEMENT1B.
  ENDIF
  STATEMENT2.
ENDIF
```

and "STATEMENT2" has suffered no side effects from the modification to "STATEMENT1."

Cobol's PERFORM-UNTIL (where the performed code must be named and must be out-of-line as opposed to the in-line code bracketed by a WHILE-DO and ENDDO) leads to a proliferation of paragraph names and scattered pieces of code. This may interfere with readability rather than enhance it and may create system inefficiencies because of nonlocality in a virtual storage environment.

Manager's Dilemma

The programming manager then is faced with a dilemma: his programmers need a better language and yet, for reasons of compatibility or portability, for example, he may be reluctant to abandon Cobol or Fortran.

Extensions to these languages have been

(Continued on Page 18)

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Yourdon is the author of *Techniques of Program Structure and Design* and *How to Manage Structured Programming*. And co-author of *Structured Design* and *Structured Programming in COBOL*.

Weinberg is the author of *The Psychology of Computer Programming* and *An Introduction to General Systems Thinking*.

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Ed Yourdon will speak about *Structured Design* — the application of general systems theory to the design of computer programs and systems. Coupling, cohesion and design strategies based on data flow and data structure will also be covered. Yourdon will also talk on the subject of *Evolutionary Design* — the concept of integrating the analysis, design and implementation of a computer system as a series of "top-down" versions.

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Open Paths, Active Guidance Help Staff to Develop

By Richard Houser

Special to Computerworld

The DP commitment is to design better, more efficient and more effective computer systems. Unfortunately, the methods used in systematizing hardware and software are often directly or indirectly applied to the human factor in a DP environment — the employee.

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Using the PPG concept can enable management to create an environment in which DP personnel can perform their roles effectively.

Carefully applied career-pathing methods greatly benefit both employer and employee. Of particular importance to a DP operations section is an integrated personnel training and development program.

Dual objectives of employee satisfaction and job interchangeability are served in such a program. Both objectives are key components of the healthy atmosphere necessary for company prosperity and individual growth.

The Human Connection

With these objectives as a guide, the operations manager can increase the flexibility and productivity of his staff while minimizing turnover, a problem which often plagues the operations area.

In the first phase of this program, the program administrator (PA), usually the operations manager, breaks down the operations section at least mentally into several distinct autonomous areas. These are usually the existing section divisions — the data control, data entry, console operations, librarian and documentation functions.

A directional path through these physical areas for employee development is established, with an individual section designated as a "staging area" for entry-level employees. Data control can serve this purpose well.

In most cases, a single path can be developed for most employees, although it is sometimes necessary to tailor a path to an individual who has exhibited special strengths and aptitudes in certain areas.

Once the PPG areas and paths are defined, the PA introduces a qualified trainee into the staging position. At this point, the trainee is known as a "novice career participant" so he is not prematurely identified with any final goal.

The PA makes the trainee selection by in-depth interviewing and determining that an individual's abilities *not experience*, exceed those required by the entry-level position.

A close evaluation of the participant's learning abilities, productivity and attitudes at each stage of development should be maintained by the PA.

The participant is then moved along the preestablished path toward his goal. The PA constantly monitors this employee and modifies the program to the individual.

With each additional experience, the participant becomes increasingly versatile and gains a wider perspective and understanding of both departmental and company goals.

After the PPG program is established, the PA can insert qualified existing employees into the development stream anywhere along the way. Caution must be used to ensure each participant has the personal capabilities, not just the experience, to attain higher level goals.

As this program gains momentum, administration becomes increasingly easier since the experienced participants will have recognized the basic formula (as applied to them) and will voluntarily assist in guiding new participants over the rough spots.

The end goal of the program is to achieve at least a minimum percentage (30% to 35%) of total employee participation, with nonparticipants ideally having been through the program.

Of greatest value is each individual's understanding that he can grow and achieve active visible goals, regardless of the frequency of promotions or terminations. And, if corporate goals are transmitted to all levels, the individual goals strengthen the section goals, and in turn the departmental goals, to the top of the organizational pyramid.

Important ingredients to ensure this program's success are:

- Upper management support of this program. During the initial stages, operations supervision and management may have to live with work force adjustment to a program of this type.
- People-oriented administration. The PA must be willing to place faith and trust in his people in order for them to grow.

Houser is computer operations supervisor at Price Pfister in Pacoima, Calif.

Precompilers Make Cobol OK for GDP

(Continued from Page 17)

discussed. But an interim solution — one that can be implemented immediately — involves the use of a precompiler to translate programs written in a language more directly suited to the GDP technique into the target language (i.e., Cobol or Fortran).

The program presented in Part II [CW, Aug. 16] was written in Scobol. The language and its precompiler were developed at Volvo Flygmotor in Sweden. Scobol permits the GDP principals to be put into practice to speed the design and implementation of superior Cobol programs.

GDP is not a panacea or an instant solution to all programming problems. It is a language-independent, problem-solving technique which, when carefully applied, can lead to quality programs. It deserves our study and experimentation.

Richard Cichelli is research manager of computer applications at American Newspaper Publishers Association/Research Institute, Easton, Pa. Martha Cichelli is a partner in Software Consulting Services, Allentown, Pa.

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COMMUNICATIONS

Cites Ease of Implementation

Insurer Starts From Scratch to Build Net for Future

By John P. Hebert
Of the CW Staff

CHICAGO – A large insurance corporation based here said it had a relatively easy time implementing an $8 million computerized communications network which would suit its needs far into the future -- solely because it built the network from scratch.

About one and a half years ago, when CNA Insurance was acquired by Loews Corp., it was a very loosely structured company, according to Jack Avignone, senior vice-president of services.

CNA realized that it had to work through the 31 branch offices dealing with different segments of the insurance industry and that the solution to the problem of fragmentation was to support the entire operation from a central point, Avignone said.

The alternative to one full-service branch to provide for future needs, he said, was to decentralize the entire operation. This approach, however, would have been costly in terms of both time and money to support and maintain equipment located in offices across the U.S. and in Puerto Rico.

Fortunately, CNA had these alternatives open to it because it was not heavily involved in computerized operations. "We were so far behind the rest of the world that we could do a lot of leap-frogging and jump ahead" to meet the needs of both the present and of the future, Avignone said.

So many other companies with a long involvement with computerized data processing and communications are often locked-in and would like to be able to start from scratch and build the network over again, he said, explaining CNA's advantageous position.

After about a year of planning, CNA began implementing the corporate communications network it had designed in conjunction with IBM.

By last March, the bulk of the network was operational, running with a 4M-byte IBM 370/158 CPU with 30 IBM 3330 disk drives, he said.

The network consists of 205 IBM 3270-compatible Courier Terminal Systems, Inc. CRT terminals, 64 IBM 3270 CRTs, 18 IBM 3284 printers and one IBM 3740 CRT data entry station in Puerto Rico which feed data into an IBM 3705 network controller.

Mixture of Lines

A mixture of communication lines – supplied by AT&T, Data Transmission Co. (Datran), MCI Communications Corp. and ITT – carries the data to and from the branch offices and the Chicago headquarters at a standard speed of 4,800 bit/sec, with two exceptions of split-streaming to accomplish 9,600 bit/sec speeds.

Removal of three Datran circuits because of "a difficulty in getting the performance we were looking for with load service at the remote locations" resulted in bringing the number of Bell System lines to 18, Avignone stated.

The MCI Communications line, however, "has been excellent," he said, and there are no plans to change it.

During off-shifts, CNA uses the network for CPU-to-CPU transmission between its four secondary processing sites which house IBM 360/20s and Mohawk Data Sciences Corp. MDS 2300 processors.

The system, according to Avignone, has cut the response time to between 7- and 10 sec on the average for CNA's 20,000 agents and two million policyholders to receive information about a particular account.

CNA is presently handling more than 30,000 messages each day through the system. It is expected to handle about 240,000 transactions per day in three years' time with only minor modifications, Avignone commented.

The teleprocessing network is supported by another IBM CPU, a 370/168 running under IBM's IMS data base management system. The IMS implementation "was not as simple and direct to bring up" as some may think but CNA received "tremendous support from IBM" in bringing this and other network phases into working order, he said.

Avignone believes the system has the capability for CNA to provide, in the

(Continued on Page 26)

Sanders Enhances It's 3270-Compatible CRT, Introduces Emulators for Non-IBM 2260 Types

By Ronald A. Frank
Of the CW Staff

NASHUA, N.H. – Sanders Data Systems has introduced a series of enhancements to its CRT terminals which are IBM 3270-compatible.

In addition, the company has developed plug-compatible capabilities to replace Honeywell, Burroughs and Univac terminals.

The 3270-type enhancements were designed to upgrade the Sanders 8180 terminal system to provide the user with features not available on the 3270, a spokesman noted. The Sanders capability lessens the dependency of the CRT on the host CPU and allows the terminal to interact with a terminal controller at the user's remote site, he added.

The field-upgradable features on the 8180 include local format storage which allows screen formats to reside in the terminal controller on a diskette or disk. This reduces communications line loading and reduces terminal transaction response time, according to the spokesman.

Another capability is queued transaction handling which allows uninterrupted data entry if the communications lines are down. The 3270 cannot function without a link to the CPU, the spokesman noted.

The local storage also allows subsets of mainframe data files to be stored at the terminal site, reducing access times, he added.

Local validation and arithmetic functions allow the 8180 to perform error-checking and editing functions at the source; a formatted local print feature allows data displayed on the CRT screen to be printed out without communications interaction with the CPU; and control functions can be added to single keys, he said.

The features are available on an individual basis depending on the user's needs. Prices range from $50/mo to $200/mo for a single feature; a disk or diskette storage capability can serve up to eight 8180 displays.

For a typical seven-display system, the queued transaction handling would cost about $1,000/mo on a three-year lease. The required diskette storage and software would cost $150/mo, a spokesman said.

First delivery of the enhancements is scheduled for the fourth quarter of this year.

Non-IBM Compatibility

Sanders has also introduced emulators which allow its CRTs to replace Honeywell 7700 and 775 VIP terminals; Burroughs TD 801 and 802 CRTs; and Univac Uniscope 100 and 200 terminals.

The plug-compatible features generally replace the original "2260-type" terminals from the mainframe vendors and emulate the original protocols using the same hardware as the Sanders 3270-type hardware, the spokesman said.

The units can be programmed with additional features or operate as mirror images of the original vendor CRTs, most capabilities do not disturb normal mainframe operations, he added.

The Sanders 8770 replaces the Honeywell 7700 and 775 VIP terminals. The 8770 adds clustering of up to 32 CRTs, synchronous transmission up to 4,800 bit/sec, faster print speeds and other features not available with the Honeywell terminals, Sanders said.

The Sanders replacement is typically priced "about 25% to 40% below" the Honeywell terminals with the additional capabilities, according to the spokesman.

The Sanders 8220 series replaces the Burroughs TD 801 and 802. It adds buffered printing, parallel clustering and faster print speeds at prices about 10% below the original systems, the spokesman said.

The Sanders 8210 U/Scope terminal emulates the Uniscope 100 and 200 terminals and adds transmission capability up to 9,600 bit/sec, buffered printing and diagnostics at a cost "about 20% to 30% below" Univac prices, he said.

The non-IBM emulators are available on a 90-day delivery with a typical 16-tube system priced at about $2,000/mo on a three-year lease with maintenance.

One- and four-year leases are also available, Sanders said from Daniel Webster Highway, Nashua, N.H. 03060.

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BSR Option Extends LA36 Capabilities

MARLBORO, Mass. – Digital Equipment Corp. has introduced a microprocessor-based feature for the LA36 Decwriter II terminal with both editing and store-and-forward capabilities.

Called BSR, the feature allows a user to prepare, edit, update and store messages for batch transmission at rates up to 300 bit/sec. The store-and-forward capability minimizes communication line charges in both DP and communication applications, the firm said.

BSR lets an operator edit messages off-line with flexibility that reportedly was not previously available using asynchronous send/receive terminals. A solid-state unit, the BSR feature has editing functions faster than those offered by current magnetic- and paper-tape techniques, the firm said.

Data within the text can be located within milliseconds, allowing a user to edit a line or multiple lines of text.

The BSR feature is on a single printed circuit board containing the power supply, control unit, read-only memory for instructions and random-access memory (RAM) for data storage. The capacity of the RAM for message storage is 16K characters maximum, the equivalent of 120 feet of punched paper tape, DEC said.

With BSR, the operator can use the LA36 terminal either in the keyboard send/receive mode or off-line preparing messages in the BSR mode.

The feature ranges in cost from $495 with 4K characters of RAM to $998 for 16K. Memory for the BSR option is available in 4K character increments.

Deliveries are scheduled to begin in October, units will be available on a 30-day order basis.

Precluded Necessary Expansion

Phone Costs Drive School to Mini for Net

By J. Donald Mild

Special to Computerworld

ARCATA, Calif. – When an analysis revealed the five-year cost of telephone equipment would equal or exceed the cost of a newly installed minicomputer, a university here began to seek another way to support distributed time-sharing terminals.

Humboldt State University, located in the northwest corner of California, has about 40% of its 7,500 student enrollment in the schools of science and natural resources, both heavy computer users. In addition, it offers a degree in business information systems.

Prior to last December, when a Digital Equipment Corp. PDP-11/45 was installed, conversational computing capacity was limited to four 110 bit/sec channels to the California State University and Colleges' (SCUC) central time-sharing computer in Los Angeles.

That facility is accessed by the SCUC's 19 campuses through a multiplexed private-line network which is also used for remote job entry (RJE) batch processing on a separate computer system. The central systems are dual Control Data Corp. 3170 and 3300 configurations; Humboldt State uses a CDC 3150 for in-house batch processing and the RJE "terminal."

The 16-port mini, acquired through a single 19-campus competitive procurement, offered the potential of satisfying many of the needs for interactive computing which the limited access to the central system had denied. The mini, in combination with central access channels, allows up to five times as many active users to solve problems or learn to program Basic as before.

Professors had been forced to cut back on their computer-related applications because of the saturated central system. They are now moving ahead again – some by converting to the mini, others by taking advantage of the reduced load on the central facility.

The PDP-11/45, with RSTS-E software and a large user library, provides 88M bytes of disk, magnetic tape I/O, a line printer and 16 programmable speed multiplexer ports. Plans called for the installation of terminals in small clusters in buildings where classes needing them are held.

Laboratories requiring intermittent terminal use will be accommodated with mobile units designated to service multiple locations according to a schedule. A variety of terminals were available, including ASR-33 teletypewriters, CRTs and auxiliary cassette tape and X-Y plotting devices.

Criteria Determined

Criteria were developed in the summer of 1975 to serve as the basis for a communication plan which would link the terminals with both the mini and the statewide network.

The key elements were that each terminal should be able to contend for access to the central time-sharing computer as well as the mini, depending upon the requirement of the problem to be solved and the number of communication lines needed would be based upon the locations to be served, rather than the number of terminals available for access.

Additionally, in order to assure full student access and optimum computer utilization (on both systems) when terminals might be out of service or when the buildings housing them were closed, at least 30 machines would be needed for access to the 20 computer ports.

Dial access communication using the university Centrex would readily allow for terminal contention and for switching between computer systems. However, dial access costs for lines, modems, etc. for a five-year period would total about $70,000 and be subject to rate increases, while the mini was priced at under $67,000.

University staff agreed such an expense was not warranted, noting the future expansion of additional terminals and computer memory and ports could be precluded by high communication costs.

A port selector, the Infotron Corp. TL 450, was found to satisfy the contention and switching requirements with hard-wired terminals. A five-year cost of about $27,000 was projected, using leased unloaded Pacific Telephone Co. (PT&T) metallic-pair circuits (without modems) including line installation and port selector costs.

The first PT&T reaction was in the form of a caution that reliability could be a problem when transmitting data on cables over 50 feet in length.

When university tests (on three-wire EIA lines) showed high reliability at distances of over one-half mile, PT&T issued a statement prohibiting transmission of unmodulated signals greater than 75 bit/sec through its cable plant.

The cost of an independent cable installation was then investigated, and it was found $7,000 would cover the purchase and installation of sufficient cable to connect 100 terminals distributed through seven principal buildings to the port selector.

For an investment of under $25,000, the university was able to provide for its current needs, and it will be able to accommodate increased ports and terminals through the incremental expansion of the port selector at a maximum cost of $175 per unit.

Lastly, a number of side benefits are derived from the in-house network:

- Troubleshooting terminal, line and port problems are simplified by hard-wire communication.
- Asynchronous transmission at up to 2,400 bit/sec has been found reliable, so users with applications (and terminals) which can use higher speeds can reduce connect time.
- The cable installation will be able to support an RJE station now being proposed for a central location on the campus.
- The cable installation will support central collection and conversion of analog signals from lab experiments, reducing the need for analog/digital conversion equipment throughout the campus.

Mild is computer center director at Humboldt State University in Arcata, Calif.

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Terminal Transactions

Bureau Finds Its Hand-Held Units Can Empty a Room

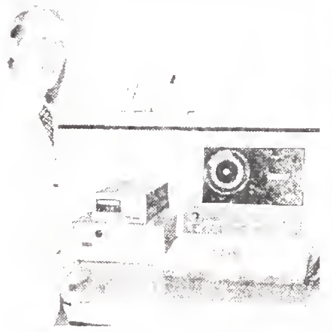
By Catherine Arnst
Of the CW Staff

BOSTON, Mass. — DP&W, Inc., a service bureau here, has a lot of empty space right now. A small, hand-held terminal has enabled it to replace five IBM 026 keypunches and seven telephone lines that filled an entire room with one phone, one tape drive and one employee monitoring the system.

DP&W handles the billing operations for doctors, dentists, clubs and several other commercial enterprises. It provides monthly and daily statements to let its customers know where their accounts stand.

When the 026s were in place, customers had IBM 1001 terminals in their offices which utilized punch cards for the information needed to prepare bills. The data from the cards was transmitted daily by an AT&T 401A dataset over telephone lines to DP&W.

Clients spent almost an hour each day transmitting the data, a process which was expensive both in dollars and time, according to Allan Holmberg, vice-president of operations.



CW Photo by C. Arnst

Allan Holmberg, vice-president of DP&W, displays the Pertec 1321.

The equipment being used was no longer being manufactured, so it was difficult to service and replace, he added. The time spent transmitting data was also a deficiency of the system, he said.

Replacement Requirements

The firm started looking for a replacement that met several requirements: low cost, easy operation, with a minimum of technical jargon for non-DP clients who would be using the unit; and communications capability that required a minimum of telephone connection time.

DP&W chose the Infopac terminal, manufactured by Azurdata, Inc. Infopac is a portable unit with a keyboard similar to a pocket calculator that contains four control keys. It has a detachable transmitting unit which is also portable and can be plugged into any outlet and attached to any phone, Holmberg said.

An operator, after inputting all the data desired, now dials up DP&W, where the phone is automatically answered and the data is recorded on a Pertec 1321 magnetic data recorder.

The terminal's buffers can hold up to 256 records and, if completely full, would take only 48 sec to transmit the data, Holmberg said.

With its old system, DP&W had to do some tight scheduling to prevent clients from getting backed up in transmitting data, he said. "There are 26 Infopac units in the field, and because the entire buffer can be emptied in less than a minute, we would never get backed up."

Few changes had to be made in the company's already existing equipment to adapt it to the Infopac. A special unit was developed by Infodata to load the information on the tape drive. This unit contains transmission indicator lights which alert employees monitoring the system to data errors.

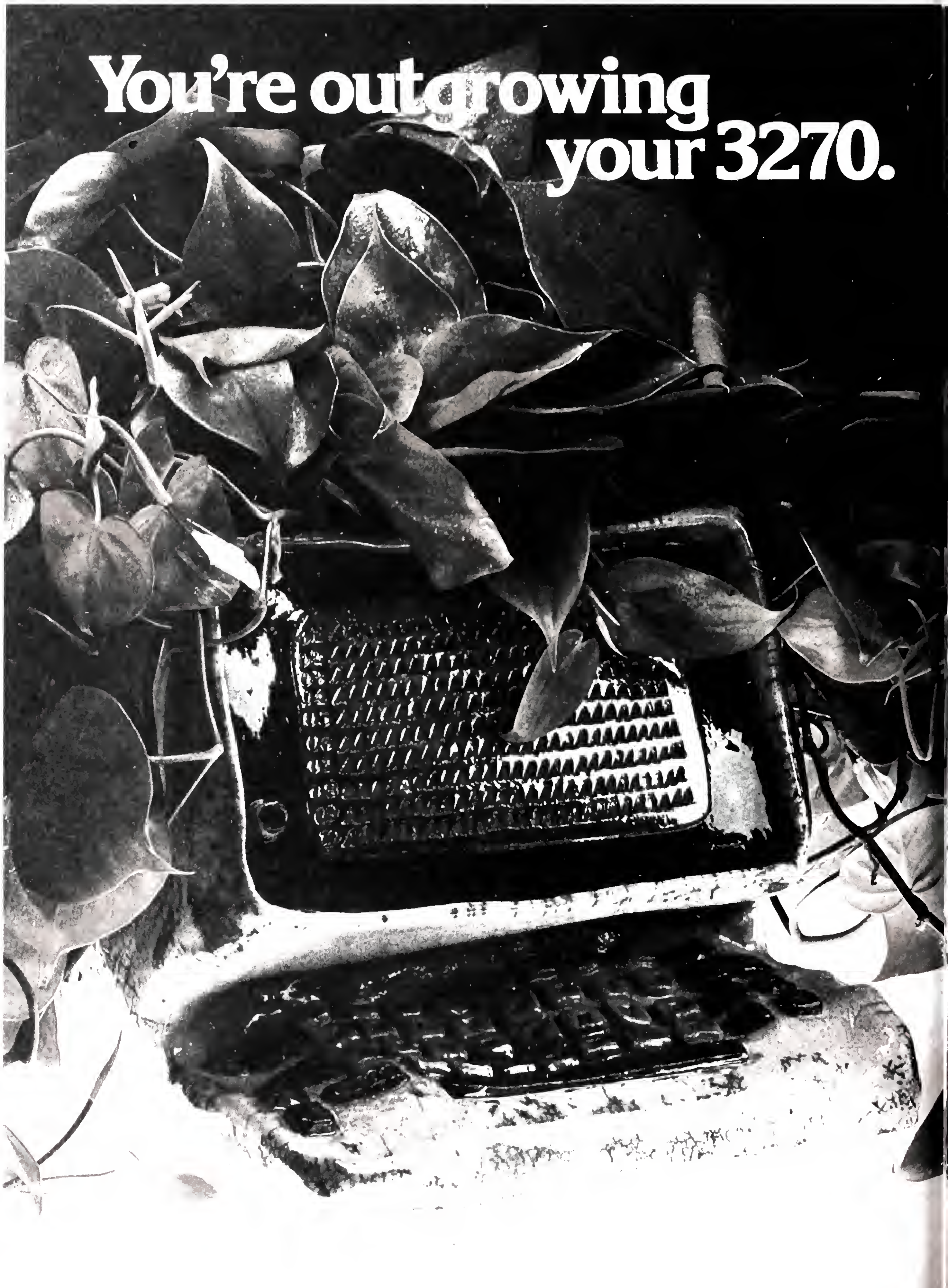
The Pertec tape drive was already owned by DP&W and only needed a circuit board changed to adapt it from a keypunch to communications mode.

The data is processed by an IBM 360/30 and billings statements are compiled three times each month. Daily printouts are also produced for each client listing, each patient, the service received, amount owed and amount paid, which, if used properly, "can be a perfect audit trail back to bank deposits," Holmberg said.

"The reactions of the customers have been great. The newness was a cause of some resistance at first, but most are delighted," he said.

The savings in manpower for DP&W with the new terminals has been subtle, Holmberg said. The company has a small staff; those employees whose time was freed up with the new equipment consequently had more time to devote to other duties, he said.

The savings in dollars have been considerable. Monthly operating costs have been cut by approximately 80% and the system should cost-justify itself over a period of 32 months, he estimated.



Codon Extends 'Dataflow'

BEDFORD, Mass. – Data communications at up to 4,800 bit/sec between a general-purpose computer system and a network of Codon Corp. intelligent terminals is a feature of Codon's Dataflow communications software, according to the vendor.

Dataflow is the most recent optional extension to the company's OS800 operating system for its models 12 and 20 intelligent terminals, a spokesman noted.

The software can be used in on-line communication via synchronous data links to remote CRT terminals, hard-copy devices or document printers.

Dataflow reportedly can be used for applications requiring automatic daily transmission of a predetermined group of files and for remote program transmission and update of utility programs.

Dataflow costs $3,000, the spokesman said from 11 De Angelo Drive, Bedford, Mass. 01730.

Bank Hits Home for Apartment Dwellers With Automated Teller Unit in Lobby

By Toni Wiseman
Of the CW Staff

ARLINGTON, Va. – Virginia National Bank (VNB) customers living in Oakwood Apartments now have all the conveniences of home – because the bank is essentially in their homes.

VNB has installed an IBM 3614 automated teller machine in the 3,000-resident apartment complex's clubhouse.

The terminal, connected on-line to a host 370/158 CPU in Norfolk, allows VNB customers to deposit or withdraw funds from individual or multiple accounts at any time of the day, move funds between checking and savings accounts, pay bills and loans and obtain current account balances.

Terminal Transactions

The installation also includes a phone which serves as a hot line to a cash flow operator at the main bank. The line is manned from 8 a.m. to 8p.m., after which a tape recoder is used to return calls the next day.

To operate the terminal, the customer inserts an Ansi-encoded plastic card and punches in a four-digit personal identification number (PIN). If the customer fails to enter the right PIN after three tries, the terminal "eats" the card as a security measure against fraud.

Withdrawals are currently limited to $100 per day per card in $10 denominations. A husband and wife, for example, would each have a separate PIN and could therefore withdraw $200.

Acceptance has been "terrific" so far, the spokeswoman said, noting 40 new accounts were opened the first week after the terminal was introduced.

VNB is also enthusiastic about the automatic teller since it cost about $60,000 to install including the environment – in this case, oak-panelled enclosures.

The cost of establishing a branch, on the other hand, would range between $200,000 and $500,000, according to bank estimates.

VNB currently has 22 automated tellers in operation, 16 in branch banks and six in remote locations. Acceptance has been high everywhere, with a terminal in the Pentagon averaging 4,000 transactions each month.

Randal Designs Interactive Unit

TORRANCE, Calif. – Randal Data Systems, Inc. has added an interactive batch terminal with editing and search capabilities to its product line.

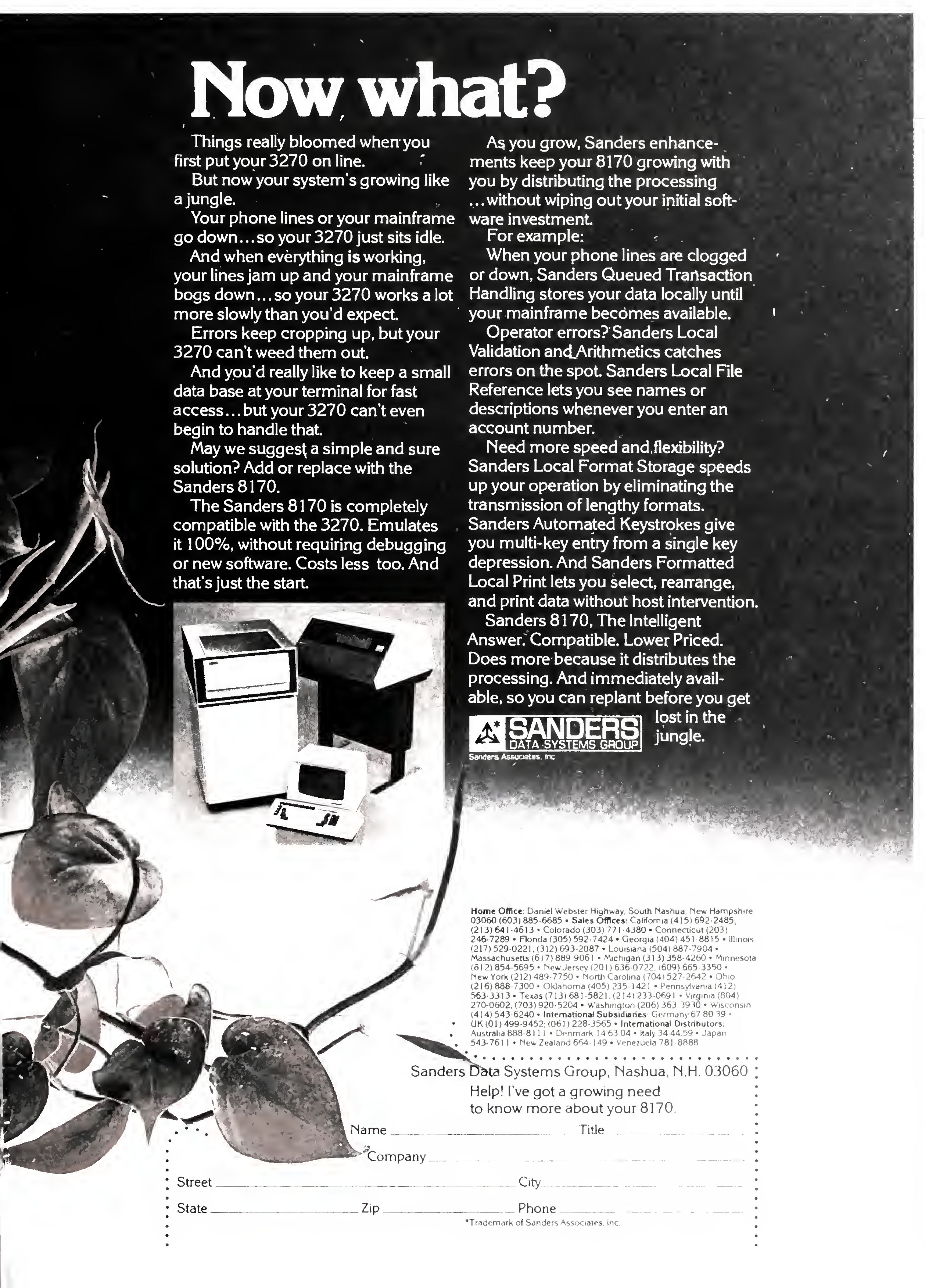
The RDS/FDR store-and-edit terminal is plug-compatible with CRT and hard-copy terminals through a full RS-232 interface capability and comes with flexible disk storage of 311K characters, the company said.

The device is capable of displaying only one line of text at a time on its LED display, with line identification and callup accomplished through a 10-key numeric pad, a spokesman added.

It can be controlled, however, from the host computer or from another terminal, he noted.

In addition, two switch-selectable transmission speeds within a 110- to 1,200 bit/sec range come as standard equipment, although options allow operation at speeds up to 9,600 bit/sec, he said.

The terminal comes with a $1,995 price tag for the basic configuration with custom configurations available, the company said. Randal is located at 365 Maple Ave., Torrance, Calif. 90503.



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Terminal Transactions

HP Adds Micro-Based CRT for Local, Distributed Nets

PALO ALTO, Calif. Hewlett-Packard Co. (HP) has added an intelligent communications display station with increased display memory and additional editing capabilities to its HP 2640 terminal series.

The HP 2645A microprocessor-controlled CRT display station, designed for both local and distributed computing networks, can operate at selectable speeds up to 9,600 bit/sec.

It has the optional capability of asynchronous or synchronous multipoint polling of up to 32 terminals on the same line, the company said.

The terminal is compatible with most computer systems and reportedly is capable of sharing modems, data lines and computer I/O channels.

Additional options to increase data communications flexibility include 20mA current loop, split I/O speed and custom transmission rates, HP noted.

To simplity the use of the terminal keyboard and to adapt it to specialized applications, each of eight special-function keys can be set up to issue a user-defined string of 80 characters or several control sequences stored in the terminal, a spokesman noted.

Instead of using several key sequences, users can program a function key to initiate file searches, operator instructions, or forms construction for data entry, he added.

Prefix keys provide access to the 2645A's multiple data paths to allow information to be moved among the display station's tape cartridges, display, keyboard, printer and data communications interface, he said.

Other features include off-line data preparation and editing capability, microprocessor-controlled memory allocation, built-in self-test and a 1,920-character display in a 24-line by 80-column format, HP noted.

Optional cartridge tape transports provide 220K bytes of storage, allowing the unit to batch information and to perform operations normally requiring connection to a computer. according to the company.

The 2645A can have up to 12K bytes of multidisplay memory available to store forms, programs or text.

Up to four 128-character sets – said to be switchable on a per-character basis – may be used concurrently, including a Roman set and line-drawing, mathematics and accessory sets.

Base price for the HP 2645A display station is $3,500; when equipped with cartridge tape transports, the price is $5,100. Deliveries are scheduled to begin in September, the company said from 1501 Page Mill Road, Palo Alto, Calif. 94304.

Unitech Has Programmable Unit

AUSTIN, Texas – The UT-2, a programmable remote batch terminal, is available now from Unitech, Inc.

The terminal includes a Unitech 12K-byte communications processor, card reader, synchronous communications adapter, cabinet, choice of three types of consoles, choice of three line printers and software for operating the terminal with customer-specified host computers, including IBM, Univac and Control Data Corp. systems, Unitech said.

Part of a family of terminals, the UT-2 is software-compatible with larger capability Unitech machines. It operates at speeds up to 4,800 bit/sec with EIA RS-232C compatible modems, a spokesman added.

Consoles available with the terminal include a choice of 10 char./sec Teletype; CRT display with Ascii keyboard entry and 25-line by 80-position data format; or a 7X7 dot matrix keyboard printer with 132 columns, 64-character Ascii and 10-, 15- and 30 char./sec operation.

Printers offered with the UT-2 are 60- to 200 line/min, 132 print position, 5 by 7 dot matrix, 64-character Ascii; 125 line/min, 132 print position, 9 by 7 dot matrix, 64-character Ascii; or 300 line/min, 132 print position (136 optional), 64-character Ebcdic (no-cost option is 64-character Ascii), 6- or 8 line/in. vertical spacing.

The terminal is said to cost "less than $700/mo" from Unitech at 1005 East St. Elmo Road, Austin, Texas 78745.

Insurer Builds Net To Allow for Future

(Continued from Page 21)

foreseeable future, many additional services that neither the company nor the insurance industry have ever offered its field offices and independent agents.

When a call is made by the agent to one of the branch offices, the customer service representative activates the appropriate system by typing in the correct policy number. Basic policy and account information is provided in seconds and relayed to the agent.

Alphabetized Program

If the policy number is not readily available on an automobile policy, the system is capable of providing the same information by use of an alphabetized program whereby the name and address of the policyholder are required, he said.

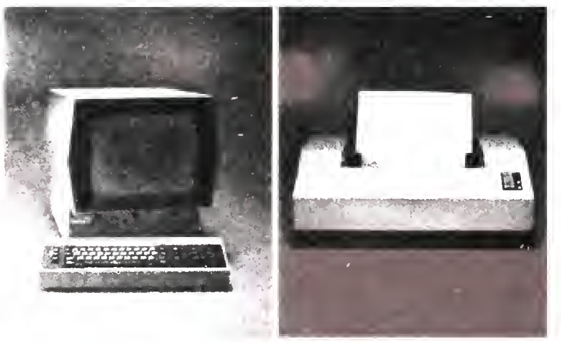
Additionally, if the actual policy documents that need to be examined are on file in another office, the system relays a message to the appropriate office where the document review is conducted and an answer is sent back to the requesting office via CRT message switching

Just One Phone Call

The agent or policyholder is contacted and the answer to the question or resolution to the problem is given. In this manner, only one phone call to CNA is required and the response is available in a minimum amount of time, Avignone said.

In summarizing the system, Avignone commented CNA "is really just scratching the surface" and cited the additional applications which are placed on the system "every day."

Hours and Theirs



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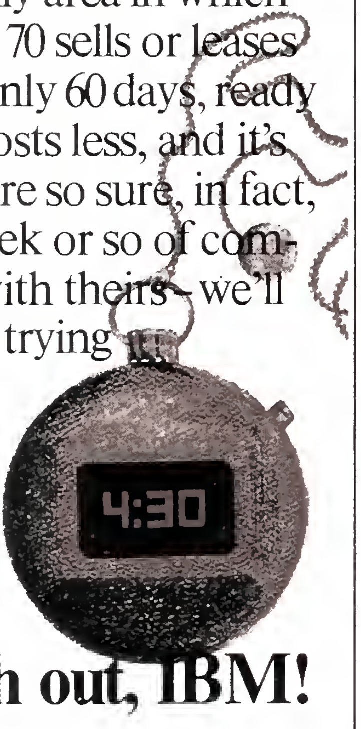

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TRIVEX+70

SYSTEMS PERIPHERALS

Bits & Pieces

Gould Printer/Plotter Works With 11-In. Coated Paper

CLEVELAND – An electrostatic printer/plotter from Gould, Inc. is said to produce high-contrast images of computer-generated graphics and alphanumerics on 11-in. wide coated paper.

The Gould 5005 prints 1,600 line/min (132 char./line) with a 64-character set and plots graphics at a maximum speed of 3.25 in./sec.

Resolution is 100 dot/in. overlapped, horizontal and vertical, the company said.

Key to the image quality of the Gould 5005 is an electrostatic writing system which includes a staggered-stylii writing head, a matrix approach to putting dot charges on paper and the design of the paper itself, a spokesman claimed.

On-line direct memory access interfaces are available for IBM 360/370, Digital Equipment Corp. PDP-11, Hewlett-Packard 2100 and Data General Nova/Supernova computers. Software includes a Plot graphics package and specialized application packages.

The price of plotter with print option is $7,560; the plotter alone costs $7,060 from the firm at 3631 Perkins Ave., Cleveland, Ohio 44114.

Data Loader Reads at 350 Char./Sec

LOS ANGELES – The Model 640 Data Loader series of paper tape readers from Addmaster Corp. can read standard 5-, 6-, 7- or 8-level tapes with no adjustments at 350 char./sec, the company said.

The readers employ LED light sources and hermetically sealed phototransistors.

The outputs available for each model in the series include: Model 640-1, Schmidt triggered CMOS amplifiers and TTL-compatible drivers; Model 640-2, Schmidt triggered CMOS data amplifiers; and Model 640-3, which has only phototransistors.

A single unit is priced at $151 and delivery takes two weeks. Addmaster is located at 416 Junipero Serra Drive, San Gabriel, Calif. 91776.

Carrying Case Protects Modules

PALO ALTO, Calif. – A reinforced interlocking aluminum valence that gives rigidity and strength and a polyethafoam-molded interior lining are said to be the protective features of a Data Module Case offered by Tab Products Co.

The Model 4802 weighs 15 lbs and measures 21-in. by 9-in.

The black case carries a single IBM 3348 module and is priced at $79.50 from Tab at 2690 Hanover St., Palo Alto, Calif. 94304.

$900,000 Savings Expected

Center Ties Amdahl CPU With CDC Gear

CINCINNATI – It was inevitable that sooner or later Amdahl's IBM 370 plug-compatible CPU would go into an installation with IBM plug-compatible peripheral gear.

That's just what happened at the Southwestern Ohio Regional Computer Center (Sworcc) here, which predicted the savings from the move will total "hundreds of thousands of dollars over the next five years."

The service center, located at the University of Cincinnati, sold its IBM 370/168 and purchased an Amdahl 470V/6, according to Dr. Robert Caster, Sworcc director. The center already had a string of 18 Control Data Corp. 33302-11 double-density disk units and attached them to the Amdahl system.

The savings from the Amdahl system should amount to $700,000 over the next five years, Sworcc officials said, while the savings on the CDC disks compared with similar units from IBM will amount to $170,000 to $200,000 over the same time period.

Caster based his prediction on savings he expected to accrue from improved cost/performance ratios and reduced overhead.

Supports 209 Terminals

Sworcc is a consortium formed in 1972 by the University of Cincinnati and Miami University, located 35 miles away at Oxford. The center serves the administrative and academic functions of both universities as well as a number of other nonprofit organizations.

The Amdahl 470V/6 at the University of Cincinnati's medical center campus supports nine remote job entry and 200 interactive terminals of various types. The terminals are located on the main and branch campuses of both universities and at a number of other user sites in the Cincinnati-Oxford area.

The University of Cincinnati is the second largest employer in the region. Caster, in addition to his duties as director of the computing center, is also assistant vice-president of business and administrative services for the University of Cincinnati.

Vendor Harmony

Happy with his multivendor installation, Caster said that maintenance personnel of the two vendors, Amdahl and CDC, work in complete harmony. "Reliability and maintainability are the best they've been in years," according to Caster.

Sworcc has been growing steadily since its founding when it replaced an IBM 360/50 at Miami University and an IBM 360/65 at the University of Cincinnati. The two installations were combined in 1972 with a single IBM 370/165, upgraded to a 4M-byte 168 in 1974.

In addition to pioneering with the Amdahl/independent peripherals combination, Sworcc will be one of the first installations with an independent CDC 38500 mass storage system.

On Aug. 16, the CDC 38500 was delivered to the center. "Data processing has been waiting for years for this development," Caster said. "It's going to replace tape to a great extent at Sworcc, and the 16G-byte added storage capability will let us expand our services considerably.

Improved Efficiency

"Efficiency will improve, too," he added, "because where it takes one to five minutes to select and hang a tape, with the CDC mass storage system we can be on-line in a maximum of seven seconds."

The CDC 38500 provides users with on-line storage of large data bases at what the vendor said is a fraction of the cost for traditional rotating storage methods. The first unit was shipped to Lawrence Livermore Laboratory in Livermore, Calif., in June; volume production of the device is slated to begin late this year.

Sworcc was selected as the first open test site for the CDC 38500 because of its diversified application base and the opportunity it offered to test the system's performance with the equipment of several vendors.

In addition to the Amdahl mainframe and the CDC disk drives, the center uses IBM tape drives, a Comten Communications controller, Singer remote job entry stations, Hewlett-Packard 2000 and Modular Computer Systems, Inc. minicomputers, California Computer Products, Inc. plotters and a mix of CRTs and other terminals from several vendors.

"It's a completely harmonious relationship among the vendors," Caster said.

A staff of 165, including 90 analysts and programmers, keep Sworcc running 24 hours a day every day but Christmas Eve and Christmas Day.

Sworcc is located a mile and a half from the main University of Cincinnati campus in the medical-science complex near Cincinnati General Hospital. It serves such diverse users as instruction and research departments, university administration, the medical school and hospital, local high schools, Mt. St. Joseph College and several government agencies.

For its two major clients – the universities of Cincinnati and Miami – Sworcc handles all phases of administrative services: accounting, payroll, personnel records, budgeting and student records.

It provides interactive computer-aided instruction, interactive computing and batch processing for a student enrollment of 50,000 students at both universities.

In support of the University of Cincinnati Medical Center, Sworcc, for example, assists the Department of Radiology in tumor therapy treatment planning. It augments cancer therapy by helping the radiation physicists in the irradiation of lesion sites via cobalt or high-energy X-radiation with a high degree of accuracy.

Still, there is computer capacity left for processing work from federal agencies as a means of helping to pay operating costs of the center. Currently, Sworcc is providing systems design and programming support services for the Environmental Protection Agency and the National Institute for Occupational Safety and Health, systems conversion for the U.S. Postal Service and scientific data processing for Wright-Patterson Air Force Base in Dayton.

Ball Adds Remittance Processor

SUNNYVALE, Calif. – Ball Computer Products has introduced the Readoc Mark IV, an automated remittance-processing system which the vendor said can read optical character recognition (OCR) documents or punched cards, audit trail, checks and remittance documents and endorse checks and encode them in magnetic ink character recognition (Micr) symbols.

A typical Readoc Mark IV system consists of a CPU with 64K bytes, a 5.8M- to 50M-byte disk drive, magnetic tape drive and one to 32 Readoc terminals and/or CRT key entry stations.

Each Readoc terminal is composed of a CRT keyboard, punched card reader or OCR reader, document transport, Micr encoding unit, check transport, check endorser, audit trail units and multiple microprocessors for control, Ball said.

"Readoc Mark IV pays for itself by saving the user money," a Ball spokesman explained. "In an operation handling a minimum volume of [illegible] payments daily processed on a [illegible] basis, Readoc can save [illegible] $[illegible]500 per 100,000 payments processed per month."

Each terminal is operated by a clerk who [illegible] document and the check. The [illegible] document [illegible] in the [illegible]

A typical Readoc Mark IV [illegible]

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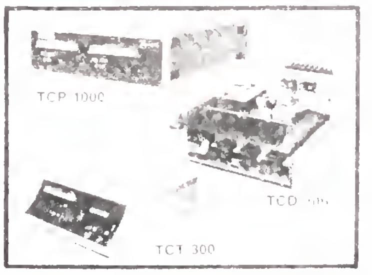
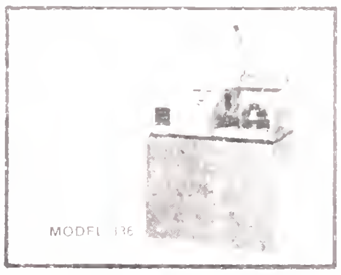


1 PDP-11 mated cartridge system [illegible] compatible [illegible] hardware & software [illegible] bezel design [illegible] Nothing equal for the PDP-11 [illegible] Nor cheaper installed and [illegible] **TCP-1000** **General purpose transceiver** [illegible] applications. RS-232C compatible [illegible] features, low cost **TCT-300** **Tape drive only** [illegible] OEM applications. ANSI, ECMA compatible [illegible] foolproof design, etc. **TCD-300**



2 Disc Testers [illegible]

CDC Adds 6,250 Bit/In. Systems For Users of IBM Tape Drives

MINNEAPOLIS – Control Data Corp. has added 6,250 bit/in. tape systems to its IBM replacement line for users of IBM 3420 models 4, 6 and 8 tape drives.

Prices are said to average 21% below IBM for purchased systems and 5% less for systems leased and maintained on a three-year basis.

The CDC 38032/34202 systems include 7- and 9-track transports with recording densities of 556-, 800, 1,600 and 6,250 bit/in. at tape speeds of 100-, 150- or 200 in./sec.

A CDC controller handles one to eight 34202-4, -6 or -8 transports intermixed in any combination, according to the firm.

Optional features allow the connection of two, three or four controllers with combinations of up to eight or 16 intermixed drives.

A two-channel switch option is offered for installation with multiple large-scale IBM 360/370 CPUs.

Purchase and lease prices for the CDC 38032 controller are $34,100 or $682/mo on a three-year contract.

A 34202-4 transport can be purchased for $17,400 or leased for $363/mo. Prices for model 6 and 8 transports are $20,500 and $23,950 respectively, or $436- and $483/mo.

Customer deliveries are scheduled for the first quarter of 1977 from CDC at Box O, Minneapolis, Minn. 55440.

German Bank Finds On-Line COM Cuts Time of Record Production

MANNHEIM, W. Germany – To cope with the ever-increasing volume of paper required by the many records which a bank must keep, the Stadsparkasse savings bank here decided to procure an on-line computer output microfilm (COM) system.

The bank chose a California Computer Products, Inc. (Calcomp) 2100 system, which can operate with either 16mm microfilm or 105mm microfiche.

This on-line COM printer prints up to 13 times faster than line printers, so the time saved in record production is considerable, R. Vietz, a bank official, said.

Print Time Saved

"Our experience with the COM system has been very positive. The system can handle a print volume of 600,000 to about 900,000 lines per hour, and so far the 2100 system has saved the bank an average of four and a half hours of print time on our IBM 370/145 every working day," he stated.

The bank uses the system's 105mm microfiche capability for several reasons, Vietz said.

Microfiche can be stored in standard index card files, in cabinets or even in desk drawers; access to desired information is extremely fast because of the small size of each fiche and because of fiche's design, he explained.

Another advantage of microfiche for the bank is its ease of duplication. Many departments can now have the same information in easily usable form at low cost, Vietz said.

Savings Estimated

"We estimate the bank saves each month more than $20,000," he said. "Principal areas in which we have saved money because of the COM system are decreased print workload for our 370/145, drastically reduced paper consumption and decrease in the number of personnel required for traditional record-keeping."

REI Modifies Trace For Insurance Firms

DALLAS – A version of the Trace optical character recognition (OCR) system specifically modified for insurance payment processing applications has been introduced by Recognition Equipment, Inc. (REI).

With the Trace configuration, insurance companies can eliminate the need to batch balance premium payments because the system has the capability to read and balance both single and multiple statements in a single pass, the company said.

Basic Configuration

The basic system consists of a 12-packet data capture transport, with a constant-speed, 1,200 document/min feeder, a single-font optical character read station and recognition unit, a subsystem controller and CRT unit and two dual-density, 9-channel, 800/1,600 bit/in. and 25 in./sec tape units.

Trace can accept intermixed sizes and weights of paper with tears, staples, dog-ears and pasted labels, the firm said.

By including a microfilming option in the configuration, both premium statements and checks can be microfilmed at processing speeds in the sequence in which they are paid, the company added.

System Options

Options to the basic system can include up to four additional 8,192-word modules of core memory, Micr reading of an E13B font, two additional six-pocket transport modules, a Hollerith mark sense reader, three additional OCR fonts, an upgrade of the basic single font to 40 additional character patterns, a microfilm module, a programmable image number, automatic film advance and selective microfilming, 300-, 490 or 900 line/min printers, two additional tape units, 5M- or 10M-byte random-access disk units and a reject reentry feature.

Capture Transports

With selected options, capture transports can be used for Micr, OCR and Hollerith mark sense, capturing data on tape, microfilming and distribution of items on the same pass.

The price of each system varies with the configurations and options chosen, and it is available immediately, REI said from P.O. Box 22307, Dallas, Texas 75222.

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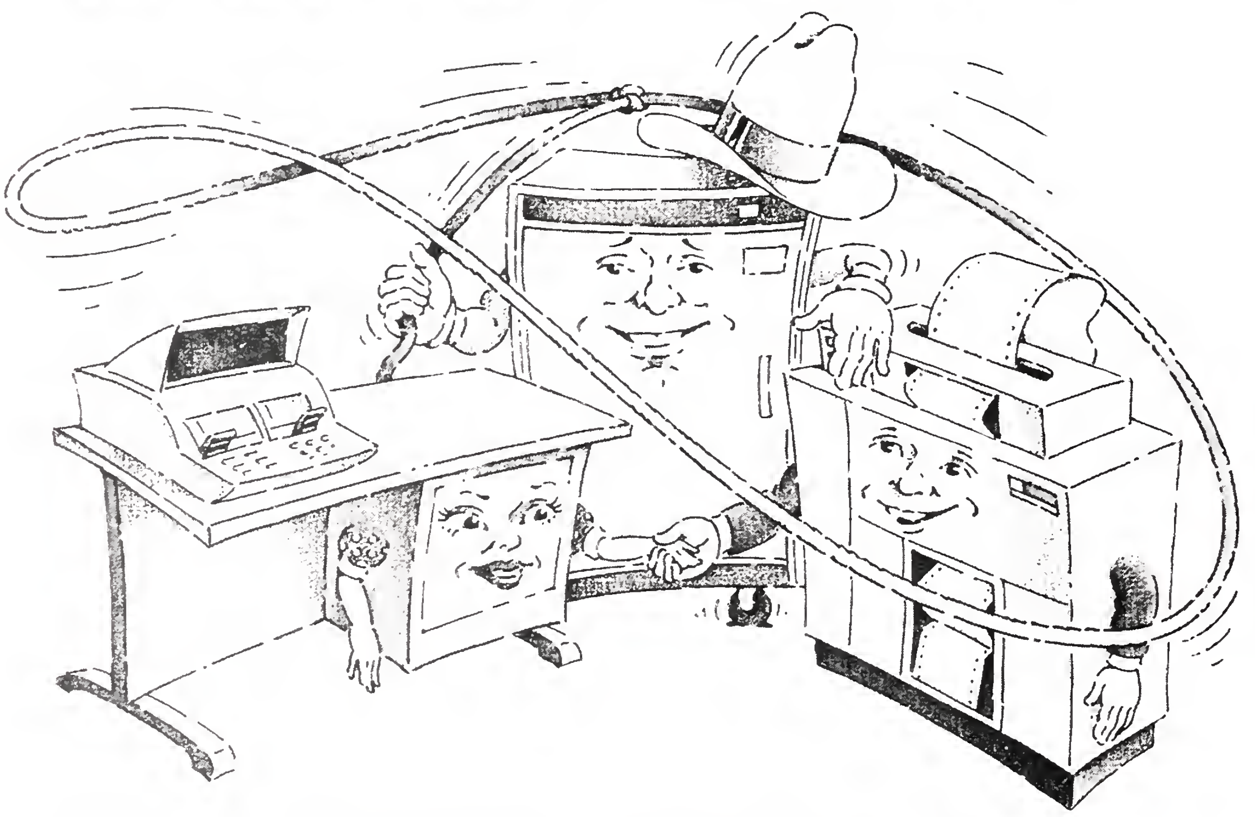

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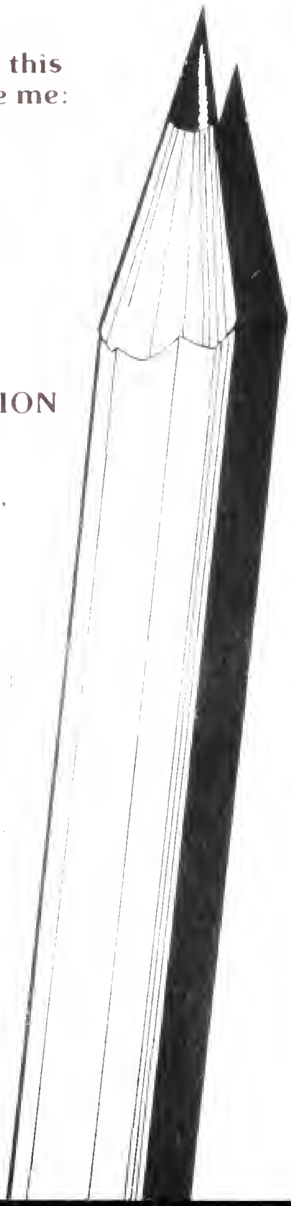

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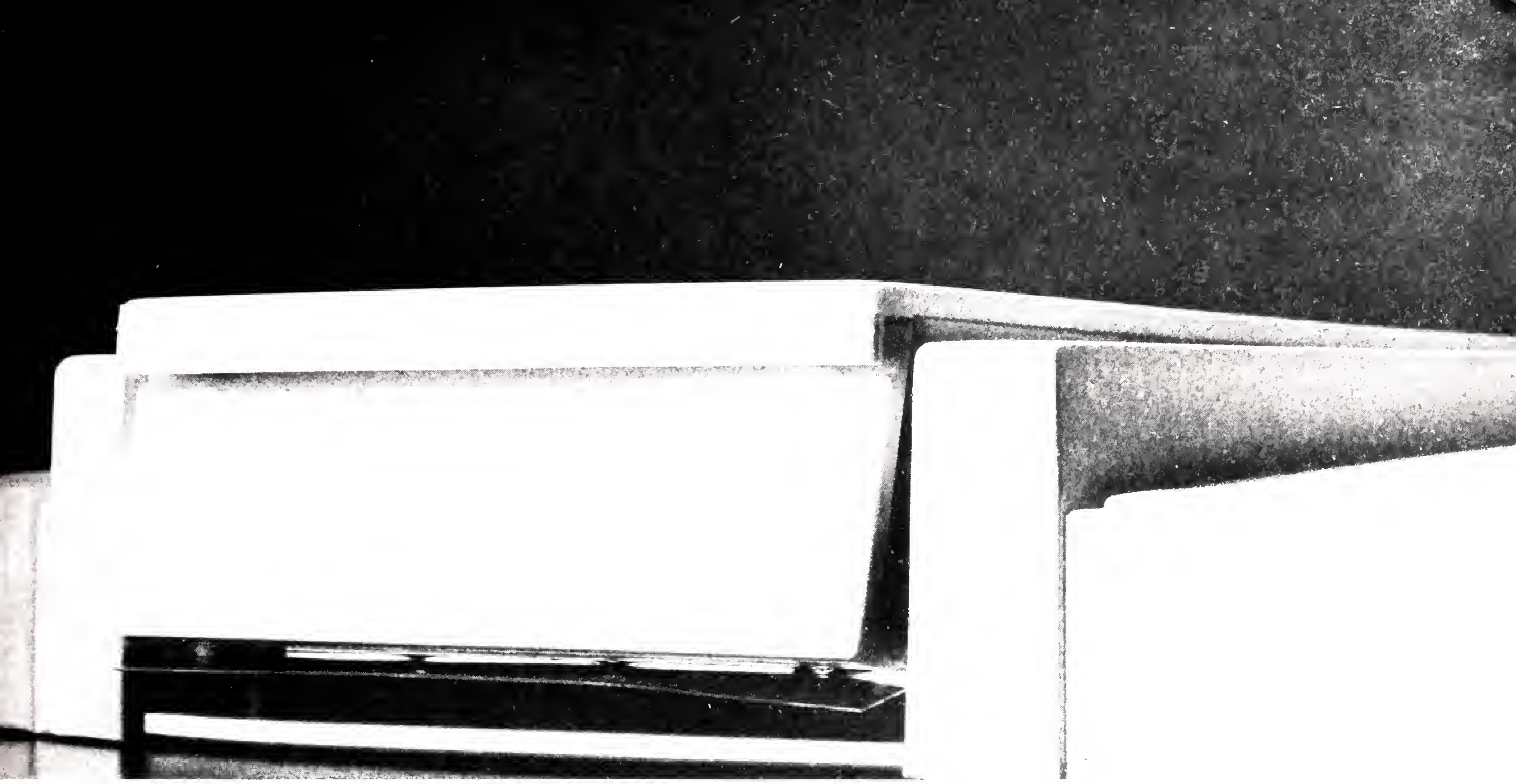

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Used for Management Information

Baker Benefits From Terminal Ingredient

ELMHURST, Ill. – For more than 50 years, the Keebler Co. has prided itself on making quality baked goods. To reach that goal, its 7,500 employees have always devoted personal attention to customers – from the actual cookie making to the distribution of its goods to the grocery shelf.

Information Systems Vice-President William Dierkes noted that in early 1974, the company identified several areas where computerization of activities at seven bakeries and 63 distribution centers, spread across 45 states, would support those efforts.

To automate its inventory replenishment process and bakery office functions such as payroll, provide for more efficient handling of sales orders and give timely management reporting, Keebler, the second largest cookie/cracker company in the U.S., added Sycor, Inc. Model 340 terminals into its management information system.

The system has justified itself in personnel savings alone and facilitates processing of orders and generation of accurate sales invoices post-invoice adjustments have been reduced tenfold.

It is on the way to reducing a finished goods inventory of $30 million by 15% as well as giving management a tool with which to control its distribution and production of goods. Today Keebler has 70 Sycor terminals and printers installed at as many remote facilities.

First installed at the company's bakeries, the terminals replaced a manual stock status recordkeeping system where the bakery clerks accounted for the finished goods inventory and shipping requirements based on order information mailed from the distribution centers.

By using the terminals, information from the bakeries is transmitted, at 2,400 bit/sec, to the corporate computer center in Elmhurst, where it is received by a master station Model 340 with a 1,600 bit/in. magnetic tape drive.

The tapes are then processed by dual Burroughs 6700 computers and the output is forwarded daily back to the bakeries where stock status, orders, transactions, production schedules and inbound shipment reports are printed out on the attached Sycor printers.

Payroll clerks no longer have to manually calculate wages at the bakeries, either. Using the terminal's programmable features, and a specially created assembler program, the clerk merely keys in the information such as maintenance and rate changes; the terminal validates all transactions before the data gets to the B6700.

While the bakery system was being installed, an automated order entry/invoice processing/inventory control system was being set up to relieve the distribution center staff of manually extending the totalling orders; summarizing sales; and forecasting inventory requirements.

The system presently processes 8,000 orders a day from the 63 distribution centers. At scheduled times, the master station unit dials the remote terminals and receives the sales order information.

Invoices are generated on the B6700 and transmitted back to the terminal for printing the same day. Other reports available at the distribution centers include a complete stock status report, inbound shipments schedule and sales summaries by salesmen and product.

The CPU is able to maintain current inventory levels and automatically adjust and forecast the following week's orders. According to Dierkes, the computerized system has helped resolve many of the logistics problems that used to be imposed by the old system.

Customers are getting accurate invoices because the branch office-entered data is error-free – the terminal does not allow invalid customer or product numbers.

Keebler's sales management can also keep track of sales by getting a complete summary of each day's order input, noting what will be shipped that day, how well promoted products are doing and the status of individual salesmen.

Because of the location of some of the distribution centers, reliability of the terminal system and the ability to service it became a major requirement.

A field service survey just completed covering the first half of 1976, for all remote terminals, showed the following results: 190 system failures, 58-day mean time between failure, 80% of the systems were back in operation in five hours or less; 95% within eight hours; for a total uptime of 98.5%.

The automated system has the flexibility for Keebler to begin planning new applications. For example, by capturing the manufacturing site and date of production for each pallet of product produced, the system will help ensure that each package of crackers and cookies is as fresh on the grocery shelf as it is when it leaves the bakery.

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Auto Parts Supplier Saving $700/Mo With COM System for Archival Records

KANSAS CITY, Mo. – Western Auto, with more than 5,000 stores nationwide, is saving $700 monthly in rentals by installing an on-line computer output microfilm (COM) system for generation of archival records.

The Memorex 1600 system is connected directly to an IBM 360/65 system running under OS in the company's headquarters, and is used for producing historical business records. The microfilm records permit access to both recent and archival records.

According to Robert K. Washburn, director of management information services at Western Auto, the on-line COM unit has many advantages. First, it replaced a printer, controller and continuous form microfilmer, which had a $700/mo greater rental rate than the monthly cost of the Memorex system.

In addition, Washburn estimated significant savings in expendable supplies. "Figuring very conservatively, solely on the basis of one-ply paper forms compared to film and film chemical costs, we were able to justify purchase of the Memorex system. Paper is roughly $3.25 per thousand pages, or 50% more costly than film," Washburn said.

Western Auto uses the COM system to produce more than half-a-million frames (pages) of microfilm each month. These outputs, produced at a rate of about 10,000 line/min contain historical records of retail credit statements, inventory and vendor reports, management information reports and accounting department financial statements and price lists.

With more than 3,000 items for sale in its many owned and franchised stores, these reports are often quite voluminous.

Pocket-sized microfilm cassettes instead of bulky paper reports are now sent to the company's 10 distribution centers around the country, saving in postage, delivery time and in storage space. Each cassette, the size of a one-inch stack of tabulating cards, contains a month's records which would comprise a cumbersome 1,000-page pile of paper.

Six Memorex 1644 viewers are used to display the microfilm records, and one Memorex 1650 viewer/printer at the company's headquarters is used to produce hard copy from the film, should that be necessary.

The reports are used by sales people at the distribution centers to evaluate store buying patterns, to review vendor arrangements for return of goods, and to determine inventory trends over long periods. An on-line inquiry system is used by the company to provide current information to the distribution centers and to chain store managers.

The COM system was placed in exactly the same location in the shop where the hard copy printer had been. "It was installed," Washburn said, "with hardly a ripple in the shop."

Before selecting the Memorex system, Western Auto evaluated various microfiche systems, but a survey of users revealed a preference for cassettes which are easy to use.

Exerciser Tests 2315-Type Drives

FULLERTON, Calif. – A series of switch-selectable tests ranging from simple restore operations through complex data exercises can be performed on IBM 2315-type disk drives from Wangco, Pertec and Diablo by the DX-1000 disk exerciser from Wilson Laboratories, Inc.

Functions include restore, seek, seek incrementing, decrement seek, increment or decrement up or down the disk and random patterns of incrementing.

The DX-1000 is priced at $1,995 from the firm at 2536-D East Fender Ave., Fullerton, Calif. 92631.

Page Printing System Makes Food Coop's Life Easier

By Bernard Hill
And Ernest R. Truax
Special to Computerworld

LOS ANGELES – In January 1975, Certified Grocers of California became one of the first organizations in the country to install a Honeywell Page Printing System (PPS). By early 1976, the giant cooperative was using two PPS to produce some 1.3 million pages per month for distribution to its members and for use in its own offices here.

Like most PPS users, Certified first became intersted in nonimpact printing as a better way of performing traditional DP operations. Jim Shiffermiller, Certified's manager of computer operations, made the analysis that started Certified toward the use of nonimpact printers.

"We wanted reports that had consistently good print quality," Schiffermiller explained. "We wanted to eliminate problems with readability such as characters dropping out because a print hammer misfired. We wanted to eliminate the fuss over who got originals and who got copies. We wanted smaller reports that would be easier to file – and less expensive to mail to members.

"And I particularly wanted to get rid of the storage and handling problems that were accumulating as we used more and more preprinted forms," he added.

Certified worked out methods for attaining these goals in several stages. In the first stage, originals were printed on line printers and then each page was photocopied manually. Then the company moved to a slow-speed nonimpact printer and finally the PPS.

As experience was gained, Certified expanded the original goals. "Today, we are doing things that wouldn't be possible with a line printer," Shiffermiller said. "For example, take a look at our retail catalog."

The retail catalog is one of the most basic media for communication between Certified and its members. It gives the member a list of items he can order and his prices for those items. The member marks up the catalog to show his order quantity for each item and returns the marked-up document to Certified.

"With the PPS, we can produce individualized catalogs for each member. We individualize catalogs by selecting only those items the member has made a policy of ordering and then indicating his costs, mark-up and retail price for each of the items," Shiffermiller said.

"Individualized catalogs help the members, but they create a data processing problem," he added. "We print catalogs weekly and over the period of a month we print around 1,500 different catalogs, each 25 to 50 pages long. And, to further complicate matters, we print a variable number of copies of each catalog.

"It's probably not possible to handle that kind of job with a line printer," he said.

Satisfied Users

Shiffermiller has found other uses for that speed. "I've just conducted a survey of about 150 of our users to test their satisfaction with our computer operations. Only three indicated they were not receiving their reports quickly enough. A couple of years ago, we would have had many more complaints."

Most of the print load at Certified is generated between 11 p.m. and 4 a.m. Shiffermiller's goal is to deliver those reports at 6 a.m. "The PPS is making that possible. It prints, cuts the paper, punches holes and collates the reports. It's eliminated decollating and bursting – and we had several jobs when these operations were a major bottleneck.

"In a few cases, the improvemenet has been spectacular. For example, the is a long report we produce monthly in 35 copies, called the Merchandise Movement Analysis.

"We used to print, decollate and burst that report as we had time, and it would sometimes take seven days to complete it," he said. "Now it's printed and distributed within 24 hours after the print tape is ready."

The history of Certified's transition to the PPS can be traced to 1970 when Shiffermiller decided to use off-line devices for printing. At that time, Certified had two Honeywell 3200's with six on-line printers. After studying the operation Shiffermiller concluded the 3200 throughput was slowed by the volume of console activity connected with printing and the need for operators to service the printers.

His first move was to acquire off-line impact printers. Next, he implemented a policy of printing reports on one-part stock and then making copies and adding fixed overlay data at the photocopier.

Certified realized several advantages here. These steps reduced the number of preprinted forms that had to be kept in inventory and, therefore, they reduced the investment in paper inventory and the storage space required; they reduced the work involved in transporting preprinted forms to and from the warehouse area; and they reduced the losses caused when a form became obsolete.

The next step was to eliminate the need to manually photocopy each report. Certified then acquired two 4,000 line/min non-impact printers that accepted magnetic tape input. Then, in January 1975, Certified installed a 12,000 line/min PPS with 16 stackers.

At the same time the software on Certified's CPUs was expanded so that instructions for running the PPS without operator intervention could be attached to print files.

In January 1976 Certified installed a second printer with 24 stackers and a hole punch. By early April the two PPS systems had absorbed the workload for non-impact printing and the other devices were returned.

Certified currently handles its processing on two Honeywell 2070's. It writes PPS print tapes directly from application programs.

Each PPS is staffed with an operator assisted part-time by a second person.

Certified continues to use off-line impact printers purchased several years ago and is using microfiche for some reports.

PPS output has generally been accepted well throughout the company. Shiffermiller reports "no complaints recently" although there was objection to the odor of early versions of PPS paper.

PPS has absorbed the major share of Certified's printing load and is printing a wide variety of reports for members and internal users. Jobs being run on the PPS and being planned for the future include invoice and picking tickets, warehouse reports, and profit incentive memos.

Certified is also planning more extensive use of the support programs for the PPS which are run on the Honeywell 2070 mainframes.

The support programs allow the labeling of report data with control block information which directs the flow of reports to the Page Printing System.

Hill is an instructor at El Centro College in Dallas and a consultant. Truax is a senior staff engineer for Honeywell Information Systems.

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System Proves a 'Real Plus'

Insurance Firm Chooses Decentralized Data Entry Policy

RALLIGH, N.C. – Switching to a decentralized data entry system has proved to be a "real plus" for Durham Life Insurance Co. here, the user said.

"In my 25 years experience in DP, I believe that decentralized data entry is the best thing that ever happened. Before we brought in our new system I was spending a lot of my time trying to calm down irate department managers wondering why reports were late," according to John B. Gray Jr., vice-president for DP.

"They didn't realize that in many instances the problem originated with their own departments in handling the source data and getting it to the computer center. Now I've got more time to do planning and budget preparation."

The equipment operated by Durham Life is a Univac 1900 Computer-Assisted Data Entry System (Cade) with 25 keystations located throughout the firm's headquarters.

The system includes two processors, one with 88K bytes of memory, the other with 96K bytes. The configuration also includes a dual disk system with 2.2M bytes of storage on each drive, two magnetic tape drives with a data transfer rate of 30K bytes and two printers operating at speeds of 200 line/min.

Twelve of the keystations are attached to one processor with the other 13 linked to the second processor.

The Cade system is a shared processor key-to-disk system with final output on magnetic tape ready for computer processing. Each keystation in Cade is equipped with a visual display which guides and instructs the operator and allows up to 32 format levels.

The processor gathers the keystrokes from the data entry stations during entry, verify, update, search and modify modes. It then translates these signals into the equivalent processor characters or function code, displays them on the video screen of the originating station and assembles them into fields, records and pages.

Data prepared on the Cade system can be processed on the company's mainframe computer, a Univac Series 70/45 system with 262K bytes of main storage capacity. The 70/45 system includes eight disk drives, eight magnetic tape units, two printers, a card reader and a card punch.

The computer processes 48 applications including individual policy administration, policy reserves, policy loans, mortgage loans, general accounting and payroll.

Most of the 25 Cade keystations are located in five user departments – Accounting, Policy Service, New Business, Group Insurance and Credit Insurance. The remaining units are used by Data Entry Control with three keystations, and Programming, with one machine.

Data Entry Control is responsible for all supervisory functions. In addition, it handles all keying for users without their own equipment or with insufficient volume to justify installation of their own keystations. Programming uses its station to develop new programs planned for the future.

The largest user department is Credit Insurance, which has eight keystations to handle a large volume of premium accounting, claims and general administration.

Policy Service utilizes five keystations for individual policy administration, entering changes in existing policies (such as change of address, beneficiary, etc.), file maintenance, premium accounting and policy loan administration.

Accounting has four keystations and one printer, which prepares checks for all payments, policy benefits, settlement of claims – virtually all checks except the company payroll.

Two keystations are employed by the New Business department for new business processing and to keep track of applications for insurance from time of receipt until the policy is issued. This department also handles some work in the policy issuing area. The remaining user, Group Insurance, has two keystations for processing premium accounting claims and administration.

Durham Life handles a full range of ordinary and industrial life, accident and health policies, group insurance and credit insurance. The company operates in 32 states and has 28 district offices.

A subsidiary, State Capital Insurance Company, handles all types of fire and casualty insurance, while another subsidiary, Durham Life Broadcasting Service, Inc., operates two radio stations in Raleigh.

It inaugurated a four and a half-day workweek of 35 hours for its employees. User departments key data into the system from 8:30 a.m. to 5:30 p.m. Monday through Thursday and from 8:30 a.m. to 12:30 p.m. on Friday. Data Entry Control operates from 7:30 a.m. to 6 p.m. daily, Monday through Friday, with one shift on a Monday to Thursday cycle, and the other working from Tuesday through Friday.

Until recently data entry at Durham Life was centralized in an area adjoining the computer center. The system used eight Inforex 1301 key-to-disk stations and 14 IBM 129 keypunches.

A major drawback to this system, Gray said, was that data entry personnel were continually going back to the originating departments to run down incomplete data or check on errors.

"There was also the problem of transporting source documents from individual department areas to the data entry section," he added.

"Apart from the time lag, a document would occasionally get lost in transit. Now that's eliminated; the documents stay in the user's area and because they don't leave the department the chance of their getting lost is extremely small."

Another benefit Gray pointed out is a smoothing out of the mainframe computer operation with scheduling much less of a headache than it used to be.

"We've found that we're having virtually no delays in getting jobs out since we went to the decentralized system. The jobs are now balanced by the user before they go to data processing," he said.

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minicomputers and small business systems

a computerworld special report aug 30, 76

Distributed Systems Slash Costs, Smooth Operations

By Esther Surden
Of the CW Staff

TROY, Mich. – Nine minicomputers in parts depots around the country connected to a mainframe here are providing Ford Tractor Operations with smoother operation, reduced costs and quicker response time to user requests, according to Albert Santoni, manager of the systems control department.

The Burroughs Corp. B772 minis replaced stand-alone IBM 3s in parts depots in Detroit; Atlanta; Memphis; Kansas City, Mo.; Albany, N.Y.; Minneapolis; Oakland, Calif.; Richmond, Va.; and Dallas, Santoni said.

The primary reason for switching from the IBM minis was to increase communications capabilities, he noted.

Little Communications

"There was very, very little communications between the 3s and the central computer; about the only thing we did was send them messages once in a while. Otherwise they were self-contained computers.

"We did the programming for them centrally, but they were operating all by themselves at the individual depots," he said.

Bids went out to IBM, Burroughs and Honeywell with only IBM and Burroughs responding, Santoni recalled. Burroughs was the low bidder and gave the firm some assistance in converting the old programs from the IBM RPG systems to the Burroughs Cobol, he added. That was in April 1975.

Santoni had also had experience on Burroughs systems at another Ford division and "was rather familiar with its capabilities as far as data communications goes and the ease of using the computer for time-sharing.

"We of course wanted to do other applications with the computer we could not do very cost-effectively with an IBM 158. We looked at Time Sharing Option (TSO) on the 158 and it just looked too costly where with command and edit langauges (Cande) on the B7700 it became a less costly deal."

Conversion Process

The conversion process, which began last November, was a well-planned affair with the user depots working very closely with the central planning group, Santoni said.

"We had weekend conversions," he added.

"All business on the 3s would be finished through Friday night, and on Saturday "we would take the inventory that was maintained at the depots on disk, .fly it to Detroit and go to a 3 that had disk-to-tape."

The tape would then be carried to the B7700, dumping the inventory into the system. All the orders the depot received on Friday would be run Saturday night and Sunday, so that by Monday morning there was paper so the picking could begin," he said.

The operators were trained at an already-working stie, he noted.

The Ford Tractor configurations include a B7700 CPU with 1.5M bytes of memory, two disk file controllers, a card reader, card punch, four printers, eight tape drives, eight disk storage drives with two packs each and a data communications processor with 24K of memory accommodating 32 lines. It is costing $55,000/mo on a six-year lease.

The minicomputers are B772 models with 32K of memory, a printer, dual disk drives, 80- and 96-column card readers, a card punch and one 400 line/min printer.

Another minicomputer, a B761 without disk, is used at the central facility for program development, Santoni explained.

The nine systems cost about $2,000/mo each on the six-year lease, he added.

Unit-Down Orders

The systems are used to send what Ford calls "unit-down orders" and stock orders from tractor dealers. The unit orders are small-quantity orders needed to get a tractor repaired quickly while the stock order is used to replenish a depot's parts supply.

The unit-down orders are transmitted about four or five times a day. The central computer compares the orders with the on-hand position of the particular requesting warehouse and, if it should be on-hand, sends back a picking ticket and shipping and management reports for that particular batch, Santoni said.

If the item is not in stock, it refers the warehouse to another close warehouse that has the item.

In the evening, the stock orders are sent, processed during the night and in the morning the picking tickets are ready and the merchandise is shipped, he continued.

The main depot in Detroit has about 70,000 different part numbers in stock. The smaller depots each keep about 24,000 parts in stock. Each depot handles from 800 to 5,000 line item/day for the unit-down and 40,000 to 60,000 items on the stock orders, he noted.

The orders are transmitted over

(Continued on Page S/8)

Why a Mini?

So you have a mainframe. Why would you need a minicomputer?

You may need a mini for a dedicated application or in a branch that's semi-independent from your parent company or as part of a distributed processing network or maybe in an individual department to take the load off your overloaded system when an upgrade seems too expensive.

Should you be thinking about minicomputers? You bet.

Because it's likely that one day your shop will be given the responsibility to choose one. You have the expertise, management thinks, and so what if you've never even heard of any of the major minis.

Is there a trend within large companies to look at minicomputers for additional processing capabilities? Although most observers say this is not occurring universally now, in the next several years it is thought decentralization or distributed processing will be a real and identifiable trend for larger organizations.

According to International Data Corp. (IDC) in a *Survey of Influential Users of Large-Scale System 370 Computers*, "distributed processing generated far more genuine interest among data processing management than any other interest," but few sites were actually implementing networks.

For the study, distributed processing was defined as the "connection, by means of communication networks, of processing resources that have been distributed to remote locations. Implicit in this definition is the existence of a centralized site from which resources have been distributed and from which some level of control is exercised."

Some large users have implemented application-specific stand-alone systems as separate and autonomous systems, IDC said.

Other large companies have implemented in-house time-sharing systems on systems separate from the central system complex, IDC said. This trend is expected to accelerate, the study noted.

So whatever your management may decide to do, it's time to think about minicomputers.

Although End-User Support Lacking

Minis No Longer Just for Mini-Sized Businesses

By Stephen J. Callahan
Special to Computerworld

PENNSAUKEN, N.J. In the past two years the acceptance of minicomputers by the business arena has been on the upswing. Prior to this period, minicomputers were thought to be the special province of the scientific/academic community and the system builder.

The advent of the small business computer and other end-user-oriented products has done much to raise the acceptance level of mini-based systems, however, the real catalyst for change has been the growing interest in distributed processing.

Distributed processing places the control over processing in the hands of the end user. These people needed a system with a defined set of capabilities at an affordable price, and the minicomputer is an obvious choice.

Initially, a minicomputer was required to supplement the activities of a medium- to large-scale computer system by offering some local preprocessing capabilities. However, the original charter for minicomputers has been expanded.

There are now some very serious investigations by users into the prospect of replacing their entire mainframe computer system with a group of minis. This is especially true of those companies which can isolate or subdivide their processing activities, with each of the activities implemented on one or more minicomputers.

This specialization gives rise to a need for a communications network – one that connects several minicomputer systems allowing users access to the full range of processing capabilities, hence the distributed processing network.

A New Posture

Not too long ago minicomputer ads featured questions such as "Is your mini system delivered or abandoned?" Now the new, more dignified posture of the mini manufacturers emphasizes their role in the discovery and development of the distributed processing phenomenon. Some of the veteran mini types must find their newly created role quietly amusing.

While it is true minicomputers are essential components of distributed processing and distributed communication networks, minicomputer manufacturers' participation in the development has been more unconscious than conscious.

In many cases the so-called distributed systems were really interconnections of various levels of sensor-based devices and systems for process control applications. So the mini manufacturers' stake in the commercial distributed processing market is in reality represented by a collection of process control-based hardware and software products.

In fact, the credit for much of the cultivation of distributed business applications belongs to the manufacturers of intelligent terminal systems and data entry devices. Their products represent an evolutionary step forward in the ability of users to control their own processing destinies but for many organizations terminal devices served only as an interim step that would lead to a need for greater autonomomy and more power. The minicomputer became the next logical step.

Users are ready, but are the minicomputer manufacturers? The answer is a qualified yes.

The basic problem mini manufacturers must overcome is their attitude toward the user.

The mini companies grew up and were fed by the OEM. This breed of buyer was dollar conscious and sophisticated.

(Continued on Page S/8)

On the Inside

Parts Distributor's Network Nets Inventory Control S/4
Manufacturing Mini Gives Hughes 'More Control' S/6
Whither Minis? The Micro/Mainframe Squeeze Is On S/7
Distributed Network Increases Agrico's Cash Flow S/9
Applications, Not Hardware, Key to Mini Successes S/12
Software/Hardware Ratio High in Mini Systems S/13
'People-Driven' System Involves Non-DPers in Net S/14
Minis, Satellites Cut Marine Corps Turnaround 300% S/17
In-House System 'A Fraction' of Time-Sharing Costs S/19
Janitor Service's System Cleans Up Customer Queries S/20

This special report was prepared under the direction of Assistant Editor/Miniworld Esther H. Surden.
Cover art by Cynthia L. Kintzer.

Two Share Data, Files

Real-Time Systems Designed for Order Processing

By Esther Surden
Of the CW Staff

NEW YORK – Two minicomputers at Borden, Inc. International here were designed to make certain the firm's complicated on-line, real-time export order-processing application has little chance of going down, according to Andrew Magrauth, director of management information systems for the company.

The Eclipse C300 systems from Data General Corp. (DG), connected to each other by an interprocessor bus and using a multiprocessor communications adapter, can share data, files and programs, Nachum Bernard added. Bernard is project director and consultant to the project from Delta Resources, Inc.

The major application – and the critical one – is the export order-processing function. "It is almost a text-editing application," Magrauth noted, "because the heading of an invoice contains a considerable amount of information beyond what you would normally find in a domestic kind of invoice.

"Also, in the body of the invoice, there is a lot of miscellaneous information inserted which may be in foreign languages," he added.

The typical invoice contains anywhere from one line on one page to 80 or more pages of 20 lines each, representing a tremendous volume fluctuation, he noted.

Secondary applications not yet on the system will include the replacement of a remote job entry terminal by the minicomputers for batch entry to the company's parent firm's IBM 370 in Columbus, Ohio; the implementation of a CRT-to-disk data entry function to replace card generation; and the use of the minicomputers for word processing.

"Our initial application is to take all the documentation we are generating associated with the development of the system and use a text editor to generate it and print it out," Magrauth said.

Decided Against Turnkey

In designing the configuration, the firm used what it termed the "system development approach," hiring an outside consultant and using "some of our own local people."

The company decided not to use a complete turnkey approach was because of the problem of control. "I wanted to have the capability to maintain the system, since it is a very significant system," Magrauth explained.

The consulting firm was hired to design the system because "we were dealing with new equipment and new software and we wanted to buy the talent that we needed for this startup period. [The consultants] happened to have someone who was particularly well versed in the areas in which we needed help," he added.

The configuration at Borden includes the two 64K Eclipse C300s (shortly to be upgraded to 196K each), two Control Data Corp. 92M-byte disk drives, one 800 bit/sec tape drive switchable between the two CPUs and a 600 line/min printer and a 240 line/min upper and lower case printer for the word-processing applications from Dataproducts, Inc.

The firm is running the CPUs in two partitions each, requiring four system consoles. Two of these are DG consoles and the other two are Hazeltine Modular One terminals.

In addition, the company has 14 more Hazeltine CRTs.

The total hardware configuration represents a $300,000 investment, Magrauth said.

Switching in Failures

Deciding the order-processing application was "absolutely critical," Borden looked into the "hot spare" approach, but Magrauth said "that approach gets very, very expensive."

The company thought the same degree of backup could be accomplished by having dual machines, with one tied to the critical application and one used for the remaining applications.

Because of the way the system was implemented, "if we have a CPU malfunction, we'll switch everything else down soft and bring the order processing over to the other CPU, or alternatively run everything in a degraded mode on the other CPU," Magrauth said.

"The system was also designed so we can lose up to two dissimilar peripherals and still run," he added. For example, he explained, a disk and a printer can go down and, although the system will be slowed, the orders can still be processed.

Although the firm envisioned running in parallel with Singer machines that were formerly processing the order entry application, the lack of Singer support for the machines made that impossible, Magrauth said. So the company began shifting geographical segments of the application to the DG machines without running in parallel and it "worked surprisingly well."

Software development was a joint effort between Delta Resources and Borden, Magrauth noted.

"The software is constructed in such a way that there is only one adapter for each CPU. When we bootstrap the system in the morning, we are able to boot from device one for one CPU or device zero from the other CPU and by so doing divorce the systems," Bernard said.

"All of the data can be transmitted from one computer to another, but as far as the utilization of resources, there is no interference between the on-line system and the program development system," he noted.

Users Pleased

The system's users have been very responsive and pleased, Magrauth said, adding that working with the system has now "almost become a status symbol although there was some initial apprehension.

"The operators have found they have total control over the system," he added, and the sales department is using it to check on order status.

During the implementation of the minicomputer system, the company did have some disturbing DG hardware difficulties; these were cleared up after the first two months. The disk controller boards were bad, Magrauth said, and the company went through about 20 of them before the problem was finally corrected.

The hardware from such firms as Dataproducts and CDC has been extremely reliable, however, he noted.

The company had estimated a 50% to 100% increase in processing ability with the system over the former method, but that seems to have been a conservative estimate, Magrauth said. The efficiencies resulting in using an on-line system were underestimated and the true figures should be about 200% to 300%, he explained.

Divorced From Mainframe

First Commitment to Minis Made With Care

NEW YORK – How does a division of a large company go about making its first commitment to minicomputers a strong and lasting relationship?

Very carefully, according to Borden, Inc. International.

"We'd been married to the big mainframe manufacturers and we hadn't been doing anything with on-line, real-time applications," according to Andrew Magrauth, director of management information systems for the company.

The firm has two 370/158s located in the Borden, Inc. corporate headquarters data center in Columbus, Ohio, "but although they are running major applications there, they are not using the kind of DP approach we were planning on implementing here in New York," Magrauth said.

The application in New York, he explained, was to be completely developed and supported locally. The company was planning an export order-processing application tied in with stock allocation, credit control, printing of invoices and accounts receivable – all connected to some existing sales applications.

The company spent about 6 man-months specifically defining what was needed. "Very early in the game we knew we wanted an interactive application, so that helped us define where we were going, but we even defined report layouts and screen layouts," Magrauth said. While the requirements were well-defined they were not tied to a certain machine, he emphasized.

When that preliminary stage was completed and approved, the firm took a look at the available hardware. "It appeared certain equipment in the IBM line should be given some consideration," Magrauth said, "and we looked at an IBM 370/135, the Digital Equipment Corp. PDP-11/70 series, the General Automation [GA] 440, Hewlett-Packard equipment and Data General [DG] minis."

A request for proposals was then put together, and all those vendors but Hewlett-Packard responded with bids and formal presentations. "We went out and visited the manfuacturers and made a final selection based on price, performance, the hardware considerations and the software," Magrauth recalled.

The next step in the selection process included a weighing of the various factors involved for each piece of equipment:

- Systems factors were examined. These included cost, reliability, expandability, independent equipment support and support for remote job entry and data communications.
- Software factors included the suitability of the operating system, the structure and performance of the application language, file management software, sorting capability, data security, operating interface commands and job independence.
- Hardware factors looked at included processor performance expectations, product life cycle positions, product stability and peripheral performance expectations.
- Vendor factors included the stability of the firm, local support and technical capabilities, service capabilities and a commitment to develop ANS Cobol.

Although Borden International is not writing programs in ANS Cobol, it wanted that option as a possibility for the future, Magrauth explained.

Each of the criteria was given a value and then each system was rated accordingly to come up with a matrix. "This got us away from the temptation of dealing with a salesman who could be a nice guy," Magrauth noted.

The selection came down to GA and DG, he continued, and company stability along with software were the deciding factors. "The GA organization at that time seemed to be going through too much a a shake-up," he said.

In addition, "we were particularly impressed with DG's operating software and the Infos file structure capability, and that has turned out to be a very, very good decision on our part," he said.

With the selection process over, the company launched the systems development phase . . . but that's another story.

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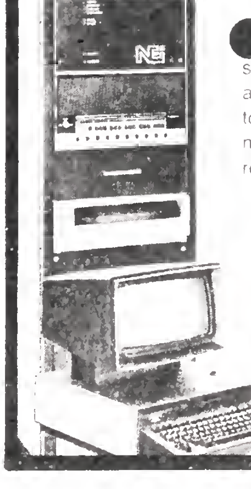

Based on 'Flock of Minis'

Parts Distributor's Network Nets Inventory Control

By Mal Stiefel

Special to Computerworld

MEMPHIS, Tenn. – Automotive Distributor Parts, Inc., headquartered here, is capping 10 years of sustained growth and data processing systems development with a multifaceted distributed inventory control system, based on a flock of Data General Corp. Novas supporting a Honeywell 66 series mainframe.

The latest iteration in the life of the system, called Tops III, is a hierarchical network, anchored in Memphis, reaching from Sacramento, Calif., to Taunton, Mass.

The system, currently undergoing tests, is expected to provide comprehensive inventory control services to Parts, Inc. (PI) and to several other auto parts distributors around the country by the end of 1977, according to the company president, Dunbar Abston Jr.

Tops III, being developed by Memphis-based Data Communications Corp. (DCC), is also designed to permit automatic order entry for replenishment of stock by more than 300 jobbers who are PI customers. The system will also furnish basic accounting services to the jobbers, Abston said.

The current system, Tops II, installed in 1974, doesn't support the jobbers. Order entry at present is accomplished by telephone calls from the jobbers to PI warehouses.

The Nova 2/10s are used in Tops II, but they only act as switches routing data from the Applied Digital/Data Systems, Inc. (Adds) CRTs to the mainframe in a polled batch configuration.

In Tops III, the minis will have a more active role, capturing and validating data, using on-line files refreshed daily by the mainframe, Abston said. The CRTs will be controlled locally by the Novas, removing much of the load from the mainframe, he added.

Dedicated Subnetworks

In Tops III, each major user of the system will have a dedicated subnetwork controlled by a Nova. In the case of PI itself and other larger users, the subnetwork will also include secondary Nova-based control stations at various warehouses.

There are eight users in the systems right now, in addition to PI. Six other distributors have made commitments to join the network when Tops III is implemented, Abston said.

Each master Tops III master control station will include 32K 16-bit words of core, a 20M-byte disk, one 120 char./sec Centronix printer to handle rush orders, a Data 100 Corp. 300 line/min printer for nonpriority work and a Teletype ASR 33 serving as an operator console.

Each master station will have a 32-terminal capacity, although no more than eight CRTs will be tied to any given master directly, Abston said.

Secondary stations, carried by the larger users, will operate under control of the masters. The secondary units will have 16K words of core, no disk and two Centronix printers.

Local asynchronous CRT-to-CPU traffic will be carried at 9,600 bit/sec, while the CPU-to-CPU net will operate at 4,800 bit/sec, using Milgo modems and Data General Corp.'s communication chassis hardware.

The network will use synchronous communication techniques, based on Honeywell's VIP line protocol.

Logical Vs Physical Net

A DCC spokesman explained that the logical network may not have a one-to-one correspondence with the physical network for each user. In some cases, secondary station transmission will be routed through the mainframe in Memphis to the master to minimize line charges, depending on the station locations. In other cases, the secondary and master stations will communicate directly.

In either case, the logical network will be the same. Logically, each secondary station will be controlled by the master, no matter how the physical network is set up.

For PI and the other major users, Tops III will provide accounts receivable and payable processing, general ledger, inventory management, sales and profitability analysis; payroll will be run for PI itself, but not for any of the others.

Jobber Net 'Most Exciting'

One of the "most exciting things" to be realized in Tops III will be the extension of the network to the jobbers, Abston said.

Each jobber will be given an ADDS System 70 floppy disk terminal tied directly to the Honeywell mainframe for on-line order entry and inquiry over a dial-up network. The CPU will pool each terminal at night to capture the day's transactions. The on-line entry capability during the day will be used for rush orders. The routine traffic will flow when the polling takes place at night.

The jobbers will enter sales data. From this information, the CPU will compute stock replenishment orders, eliminating the need for a separate ordering function except in extraordinary circumstances.

The system will also provide accounting functions, sales analysis, and profitability analysis to the jobbers, although it won't support the jobber billing function, Abston added.

Tops II, the current system, was built in a relatively short time to allow replacement of Honeywell 7700 terminals in warehouse locations and to eliminate Honeywell Keytape units. The Novas were brought in to emulate 7700 terminals, so the changeover was invisible to the CPU.

The original Tops II mainframe was a Honeywell 2000. The Honeywell 66 was brought in as the first step in Tops III, to improve system response time and to incorporate a warm restart capability. Abston emphasized that the 2000s were a "super family of computers," but not designed for an on-line environment.

Just completed...a definitive study

Back-end Database Management Systems

Developed by Cullinane Corporation with supporting research from a major university, this $50,000 study (jointly funded by Cullinane Corporation and several key potential end users) is a definitive state-of-the-art treatment. Purpose? To lead to a commercially viable back-end DBM system.

The study will be of real value to end-users or computer manufacturers interested in using minicomputers interfaced to IBM 370's or other systems in back-end or distributed data processing.

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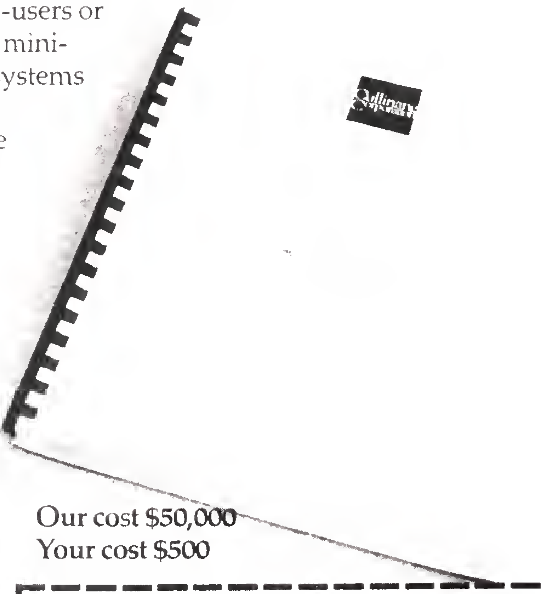
☐ Host/back-end configurations. Five possible arrangements.
☐ Database technology. CODASYL specs and IDMS implementation.
☐ Distribution of software in a host/back-end configuration.
☐ The inter-computer communications system. (ICCS)
☐ Mini-computer architecture.
☐ Back-end hardware requirements for a DBMS.
☐ An evaluation of 33 mini-computers for back-end use.
☐ DBMS performance in mini-computers.



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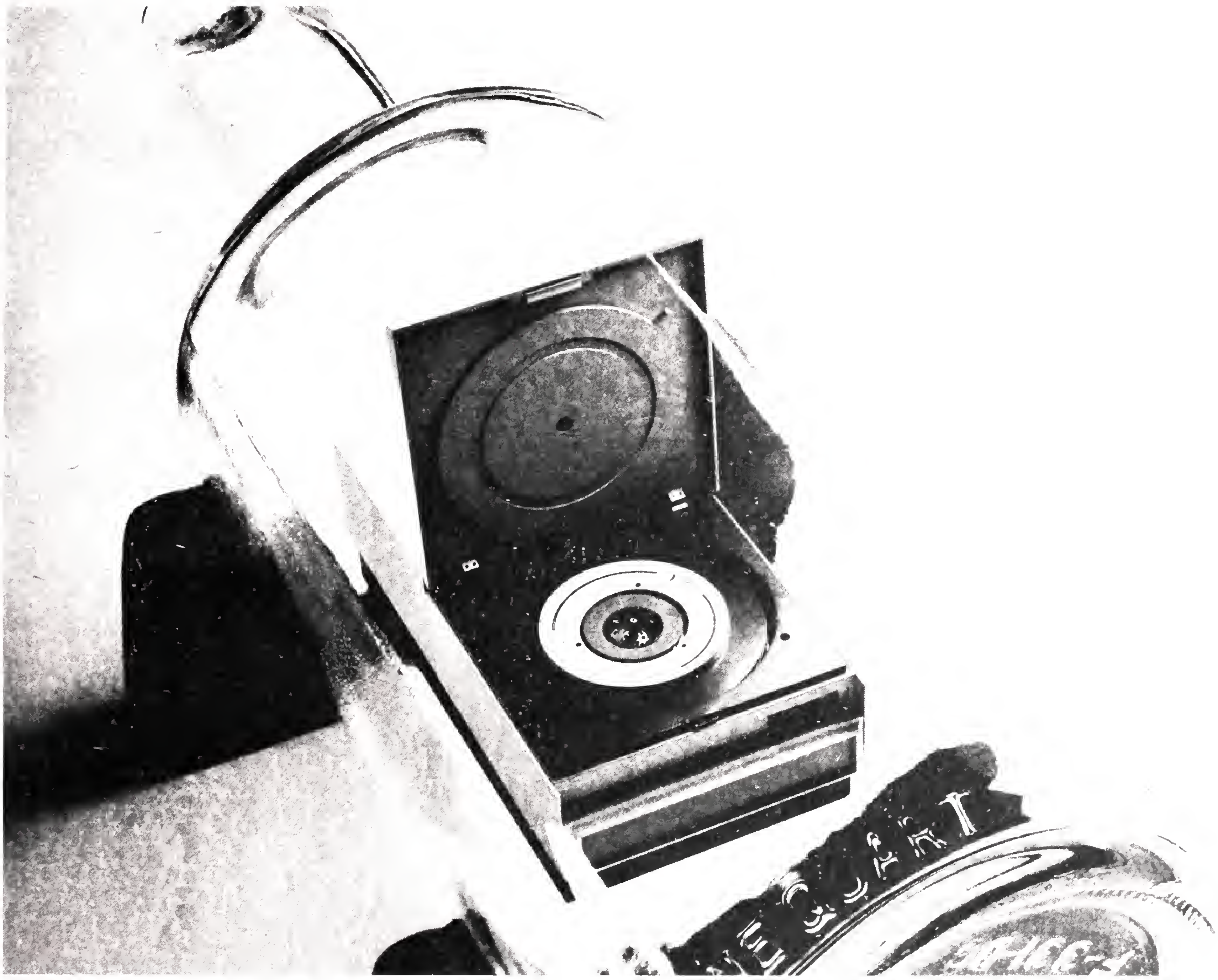

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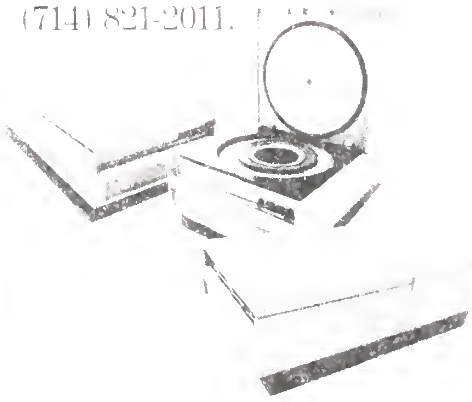


CALCOMP

Without Programming Staff

Manufacturing Mini Gives Hughes 'More Control'

By Esther Surden
Of the CW Staff

CARLSBAD, Calif. – A division of a large firm here found a dedicated minicomputer was the best way to go to achieve more effective control of its manufacturing operation.

The Industrial Products Division of Hughes Aircraft Co. considered both time-sharing and batch-oriented systems and decided a dedicated minicomputer could best do the job, according to Jack McNamee, data processing manager.

"We had determined what our needs were, interviewed all of the nationally known computer hardware vendors and did quite a weighing between the cost of buying and that of renting or leasing.

"I guess what it really boiled down to was: What could we get that would serve our purposes for the least amount of money?" McNamee said.

"Although my title is director of data processing, my background is in manufacturing," McNamee noted. The division wanted a system that would not require a programming staff.

Challenge to Vendors

"The wheel had already been invented and we knew it had been invented and we also did not want to go with a batch-type system. We wanted an on-line system, and very few of the vendors accepted our challenge."

The "challenge" to supply both hardware and software for an on-line manufacturing management system was met by Hewlett-Packard Co. (HP) in conjunction with ASK Computer Services, Inc.'s Manman software package.

The software provides inventory control, keeps track of all purchase orders and all processes on the assembly line. But history such as this does little good unless it can tell something about the future as well, McNamee said. So the system maintains order demand files, files of spares on hand and forecasts and comes up with a material requirements planning system. This tells what the future demands will be, what order they will come in, what should be sold and what will be needed for spares in stock.

"When we run that program, it looks at the quantities we are after in our bill of materials, looks at the stock, purchase orders and work in process and then comes back and tells us what we have to buy, when we have to buy it, when it should be in the stockroom and when we can ship to the customer," he continued.

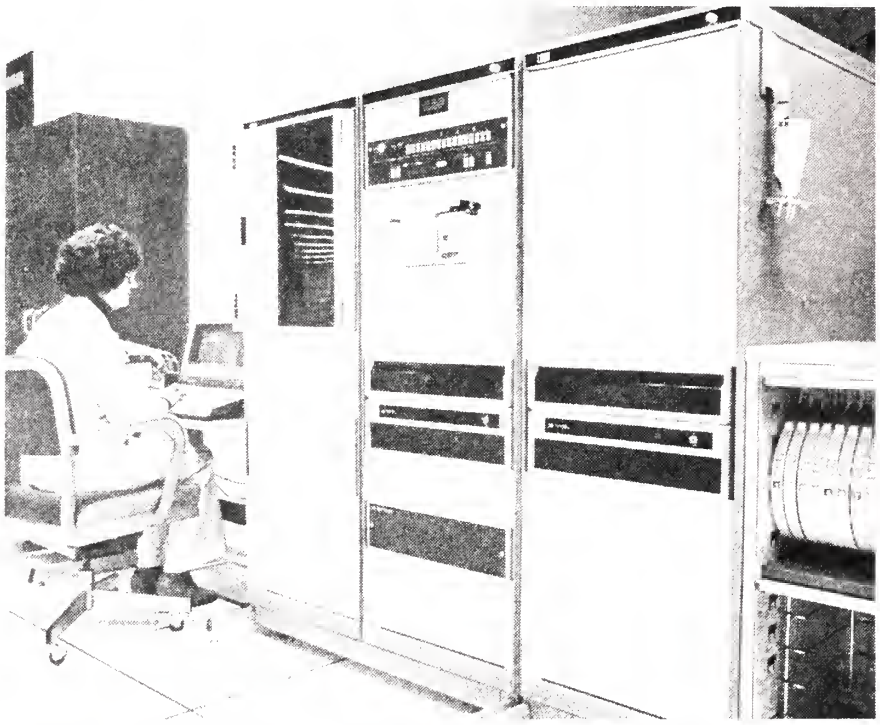
The system keeps inventory in an "as-needed" state, without it running too high or too low and gives the firm the visibility into the inventory that wasn't available before, McNamee said.

The configuration at the company includes an HP 21MX with 32K words of memory, a 1,600 char./in. tape drive, 15M-byte disks and a 200 line/min printer.

The company also has four CRTs located in the stockroom, receiving, production control and purchasing departments. The hardware and Manman software together cost the firm about $150,000, he noted.

Pleased With Support

The system, which has been operating since March, has proved to be very reliable, and McNamee is very satisfied with the support from both the minicomputer maker and the software vendor.


Melba Brookbank works on a Hewlett-Packard system at Hughes Aircraft Co.

The mini hasn't been down for any unacceptable length of time. As an example of the software support, McNamee said, "We had several requests for changes on reports that were rather urgent because we were approaching the end of the fiscal year, and we needed to change a format or something on the report." He called ASK in the morning and by afternoon some personnel had flown in from San Francsico. The changes were done by the next morning, he said.

The primary benefits from the system have come in manpower savings, he noted. "We haven't had it on the air enough to be able to appreciate a change in inventory levels yet," he said.

Previously everything was done manually, he noted.

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Whither Minis? The Micro/Mainframe Squeeze Is On

By Jean Bartik

Special to Computerworld

OCEANPORT, N.J. -- After six years of growth in the use of their output, minicomputer manufacturers are at the crossroads.

Many right decisions need to be made if a manufacturer is to continue increasing gross sales at a 25% clip.

Minicomputers are surrounded. Microcomputers are to the left of them and mainframes to the right. Minicomputers are now caught in the middle. Where do they go from here?

The decisions that will be made will inevitably affect the minicomputer user.

Minicomputers no longer offer the cheapest hardware; they never offered the easiest solution to user programs. A minicomputer user needs to be knowledgeable about computers as well as his application.

Up to now, the minicomputer manufacturers have expanded markets both up and down. They have produced smaller, faster, cheaper models for the low end of the market and bigger, more powerful and more expensive models at the top end.

The top-end models from most minicomputer manufacturers can compete on straight hardware performance with the IBM 370/158. The low-end models compete with the Intel 8080 microcomputers.

The top minicomputer models, however, cannot compete across the board with the IBM 370/158 because minicomputer manufacturers do not provide the same support as IBM. Markets must be selected where users do not require the support only an IBM can provide.

The low-end minicomputer models can compete with end-user microcomputer systems, but not with the volume OEM microcomputer. The price of the logic on the microprocessor chip is so low only a semiconductor house can afford to produce it.

Some Big Questions

Right now, the management of each minicomputer company must answer some big questions. The answers to these questions will affect what users can expect from each company in the years ahead. The answers require long-term commitment in development and dollars.

- To succeed, must a minicomputer manufacturer develop an in-house semiconductor facility?

This is a hard question to answer, and it is being argued at many management levels throughout the minicomputer industry.

Developing a semiconductor facility requires an expensive, long-term commitment. It will tie down a company's development team so it can't pursue other development projects.

Most minicomputer manufacturers will buy a facility already in production. To develop a microcomputer chip for an established minicomputer line takes about three years and a minimum of $2 million or $3 million.

Production volumes for minicomputers are low in comparison with efficient semiconductor capacity. Recouping that large investment from traditional minicomputer markets is impossible.

Markets must be expanded so tens and hundreds of thousands of units are sold each year.

The biggest advantage a microcomputer emulating an established minicomputer line has over a general-purpose microcomputer developed by a semiconductor house is the software available to run it. For applications requiring minimal software, that advantage disappears.

Computer people, traumatized by the horrendous software problems the industry has had, intuitively believe a pile of software is an asset. But is it?

It is important to an end user who expects a microcomputer to behave like a minicomputer. To a less demanding user who requires little of the microcomputer's intelligence and will waste most of it, software has little meaning.

- To succeed, must a minicomputer manufactuer develop comprehensive networking software?

With the current move toward distributed processing, all the mainframes and some of the minicomputer manufacturers are developing comprehensive networking software. Is it necessary for success? Does distributed processing mean networking per se?

Developing comprehensive networking software, like developing an in-house semiconductor facility, requires a long-term commitment. Software development time is about five years. Cost will vary depending on the number of systems for which software must be developed, but it will run into the millions of dollars.

Computer networking is in its infancy and growing rapidly. Certainly, many networks will be set up. Distributed processing, however, does not necessarily mean networking. Many applications can be offloaded from a central site and handled completely by minicomputers. Or a new application can be implemented using a mini without ever becoming involved with a central computer facility or other computers.

Certainly all minicomputers need a variety of data communications facilities to communicate in standard ways with other computers. Data communications software, however, is less complex than full-blown networking facilities.

Network software must be complex to allow a manufacturer's computers to perform the roles of host, node or terminal in a network, to maintain control, to route messages, to recover from errors, to decide what to do when parts of the network go down and to maintain service.

Also, networks have problems that may inhibit their widespread use. One is the problem of overall network security and the other is overall network control.

Perhaps a minicomputer manufacturer might be better off developing software so its computers can emulate popular terminals and make its major investment in special applications software.

Commercial Market

To succeed, must a minicomputer manufacturer pursue the commercial market?

Most minicomputer experts generally agree minicomputer manufacturers cannot maintain their 25% per year growth rate without going commercial. The commercial market is so broad that answering "yes" to this question is meaningless. Which commercial markets. Where? How?

Most people divide the commercial market into functional markets without re-

(Continued on Page S/18)

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Minicomputers Now Province of Commercial Firms

(Continued from Page S/2)

He bought a mini to meet a strict set of technical specifications, modified the operating system, supplied his application software and was generally never heard from until the next buy.

This kind of self-sustained customer has left the mini maker with a poor sense of what is meant by true end-user support. So far, in their pursuit of the end user, minicomputer manufacturers have learned to dress up their advertising and create snappy marketing terms to describe their distributed processing offerings.

However, they have a long way to go in understanding what is meant by full end-user support.

If the mini manufacturers are slow learners, they may become eclipsed by another market supplier, the medium to large computer mainframe manufacturer.

This group is beginning to embark on a new learning curve – the one that teaches one to think small.

Already there are rumors and test marketing of minicomputers by the major mainframes who know what is meant by full support, but lack a sense of scale. To date, they have tended to overbuild for the mini market.

So there is a deadly serious horse race between the traditional mini makers and the mainframers-turned-mini-manufacturers. The group which gets over its learning disability first will, in all likelihood, claim the lion's share of the distributed mini market.

In the meantime, users implementing distributed processing networks are caught between a rock and a hard place. Should they get started with a mini manufacturer who does not fully recognize their needs or wait until the majors get their product line ready for the market?

With spirit of adventure, users are going ahead, however imperfectly, in a partnership with a mini manufacturer. The mini manufacturers show evidence of willingness to work with and learn about this demanding, but potentially powerful, new class of customer, the end user.

The investment by the mini manufacturers will pay handsome rewards in the future. The name of the game in distributed processing networks is experience.

As the mini companies continue to tally more networking experience, they are putting more distance between themselves and the majors.

Callahan is a managing editor at Auerbach Publishers, Inc., 6560 N. Park Drive, Pennsauken, N.J. 08109. This article is extracted from Auerbach Distributed Systems, *an updated information service.*

Network of Minis Eases Operation And Reduces Cost

(Continued from Page S/12)

4,800 bit/sec dial net lines Ford has for all its applications, he added. In some cities, where the traffic on the lines is too heavy, the firm plans to change to dedicated lines.

Sales Reports Applications

Although 90% of the activity on the minis is dedicated to this application, the minicomputers are also used for sales reports. This is because "the depots are sitting next to our sales offices," Santoni said. Tractor sales status reports are sent to the salespeople in the field to tell them, for example, if a particular tractor has been placed at the plant for production, or if it is scheduled for production for a particular day. The parts people walk the reports over to the sales department, Santoni noted.

The central system is used "primarily to process all the data that comes in and keep track of how the small depots must be replenished from suppliers or from the larger depots."

The central system also does all the accounting and invoicing for the transactions centrally. Prior to the new network, the accounting function was decentralized. The company has realized a cost savings by removing the accounting people from the depots, he said.

A primary benefit of the Burroughs network is it has smoothed out a rough work day at the central facility. Under the 3s, Santoni explained, each depot operated all during the day until about 1:30 p.m.

Then the depots would know the parts they could not fill because they lacked the inventory. A report of the needed parts was fired off to Detroit because Detroit has the largest inventory.

Then the "Detroit depot would scurry from about 2:30 till quitting time to get the stuff out."

Now at 9 a.m., when the depots get the first batch in, the main depot knows about the needed part by 10 a.m., and so on through the day.

The communications programming was performed by Burroughs while Ford did the applications programming. Santoni estimated programming took Ford and Burroughs each three man-years of investment.

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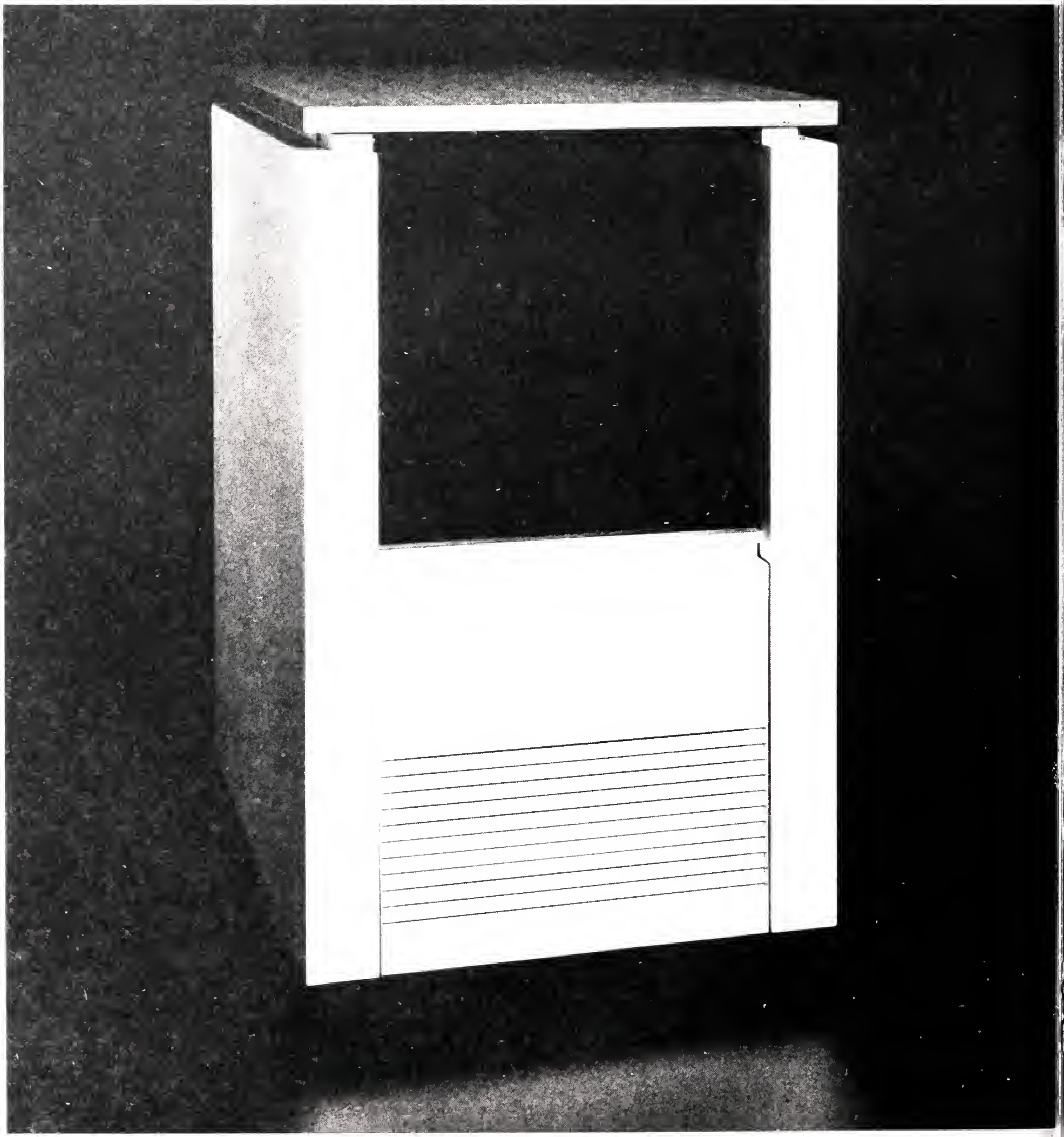

IBM 3s Linked to 370

Distributed Network Increases Agrico's Cash Flow

Special to Computerworld

TULSA, Okla. – A large agricultural concern's distributed network of minicomputers linked to the company's mainframe here has allowed "greater profit potential through increased cash flow," according to Henry T. McCarley, general manager of retail sales for Agrico Chemical Co.

Roger Mayer's Farm Center looks to the minicomputer-based service of Agrico in Tulsa, Okla., for the information needed to help keep businesses operating at a profit with a high level of customer service.

Roger Mayer is one of 80 Agrico employees operating farm centers in communities across the country. Each center is linked to the corporate headquarters through a distributive network of regional IBM 3s and an IBM 370/158 in Tulsa

Agrico is a subsidiary of the Williams Companies. It produces, distributes and markets fertilizer products.

Agrico has installed a Retail Marketing System around 3/10s in each of its three retail sales division headquarters. These systems, through 3741 data entry units, communicate with the 370 in the Williams data center.

Division offices are located in Saginaw, Mich.; Wilmington, Del., and Henderson, Ky. The Haubstadt Farm Center is one of 34 that report to the Henderson office. Each serves from 50 to 400 customers.

"Each center manager gets a monthly income statement showing exact profit and loss," McCarley said.

"The manager is the source for all information flowing through the system, a business man as well as a knowledgeable farmer."

The system meets the central needs of a retail organization, McCarley said. "We're a business within a corporation, and we can reflect that with our computer network. I've talked to a lot of people in this industry, and so far I haven't found a company that relates to profitability by facility like we do."

Each manager is responsible for submitting a variety of daily information to the division offices, including invoices, inventory adjustment forms, accounts payable and receivable, asset adjustment forms and payroll.

This information is entered into the Model 10 at the division office and recorded on IBM diskettes capable of holding the equivalent of 250 invoices each, McCarley said.

An entire day's business can be transmitted over telephone lines from regional offices to Tulsa in eight minutes. Once received in Tulsa, the data is processed on the Model 158, which generates reports for use by divisional offices and farm center managers. The reports are back in management's hands the next day, he noted.

"This distributive method of data processing has real advantages for the manager, while enabling corporate management to see what's happening on a day-to-day basis at remote locations," McCarley said.

"The distributive system works great when you consider that our people in 80 remote farm centers need to know what's going on in their operation, yet can't spend time attempting to analyze hundreds of documents. There wouldn't be time to run the business and compile reports too. Now we get answers at both ends in a very short span.

"With this system, we've minimized errors, increased the speed of reporting for profit and loss purposes and have given our farm centers a greater profit potential through increased cash flow."

"This is a seasonal business," Mayer said. "Information from the reports is crucial particularly, during the busy seasons in April, May and June. Our customer statements help me answer any questions my clients may have.

"The sales analysis report provides me with a gauge of what products are moving and when. That's important, because we're dealing with a business that doesn't operate on an even keel 12 months of the year."

The benefits go both ways. McCarley uses a weekly sales analysis report in Tulsa.

"When I see something that isn't moving, I can pick up the phone and find out why. The system is geared to show the profitability of all our products. Management here and at the centers places emphasis on selling the most profitable lines. If we didn't, it would show up on our reports.

"The system complemented our way of doing business. We built it around the business, not the other way around."

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The one big minus? The Model 4000/15 timesharing system costs $35,950—representing a $20,000 reduction over the previous lowest-cost 4000. The bigger 4000/25 system is available at similar savings.

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PRIME

Applications, Not Hardware, Key to Mini Successes

By Dr. Heinz Dinter

Special to Computerworld

In the past, if the prudent businessman didn't stop cold in his shoes upon studying a proposal from a computer vendor because of the high cost of a system he earned himself the admiration of his stockholders.

And if he was able to discover that the computer's purchase price was only the tip of the iceberg, he earned their respect.

Total DP costs can go straight through the ceiling when one adds the costs for the programmers and operators.

The businessman certainly earned himself a medal if he was able to foresee all costs associated with malfunction, misfunction and nonfunction of complex machinery which couldn't be handled because properly qualified people could not do the job right.

The days of price tags for computer equipment with full systems power exclusively in the $200,000-plus price range are gone forever.

The minicomputer has made it possible for the prudent businessman to purchase a system with a full complement of peripherals for less than $100,000. Evidence also abounds to prove that these machines work very well and are highly reliable.

Unfortunately, however, the technology which has brought us the minicomputer has yet to find a cure for the major ill of a business operation: the implementation of computer programs and application systems to get the job done.

The system must print paychecks, control inventory levels and report whether a profit has been made by the business enterprise at the end of the year. Management control over the DP operation has become more manageable with the mini as well.

Tip of the Iceberg

The minicomputer costing $75,000 can do the work of a small computer system offered by well known major manufacturers costing as much as $225,000 with fancy sales brochures galore and mountains of pretty manuals thrown in to boot.

Gee, what a bargain! Beware!

And beware for the same reasons that those who cannot see below the tip of the iceberg have been badly misled by the biggies and their biggie machines. No computer will do its job and produce an invoice unless there are good people who can make the machine produce good results.

However, the fact that a minicomputer may cost one-third that of a big brother's machine does in no way mean the cost and effort of software development is also two-thirds less. Frankly, the problem with a mini may be even somewhat more complex if one is able to overlook the fact that a $75,000 computer is not doing its job it is not as bad as when a $200,000 computer is sitting collecting dust.

Minicomputer manufacturers bend the meaning of the word "ethics" to the utmost limit if they tell you they see no reason why the accounts receivable system can't be up and running in no time.

Despair not yet. There is a way to reap the benefits of the minicomputer technology. Those benefits come from companies which specialize in turnkey systems.

The businessman in need of sufficient computing power can go to such an organization and draw a contract which will include the purchase and maintenance of the hardware, the development and implementation of application systems and the continued support for those applications systems.

If there are any elements the systems house is unwilling or unable to provide, then you should stay away.

Inasmuch as minicomputers and related services are more easily obtainable than an end zone ticket for the Pro Bowl, it is by no means clear how you, as an inexperienced purchaser of computer equipment and services, can effectively evaluate proposals which could flood your desk.

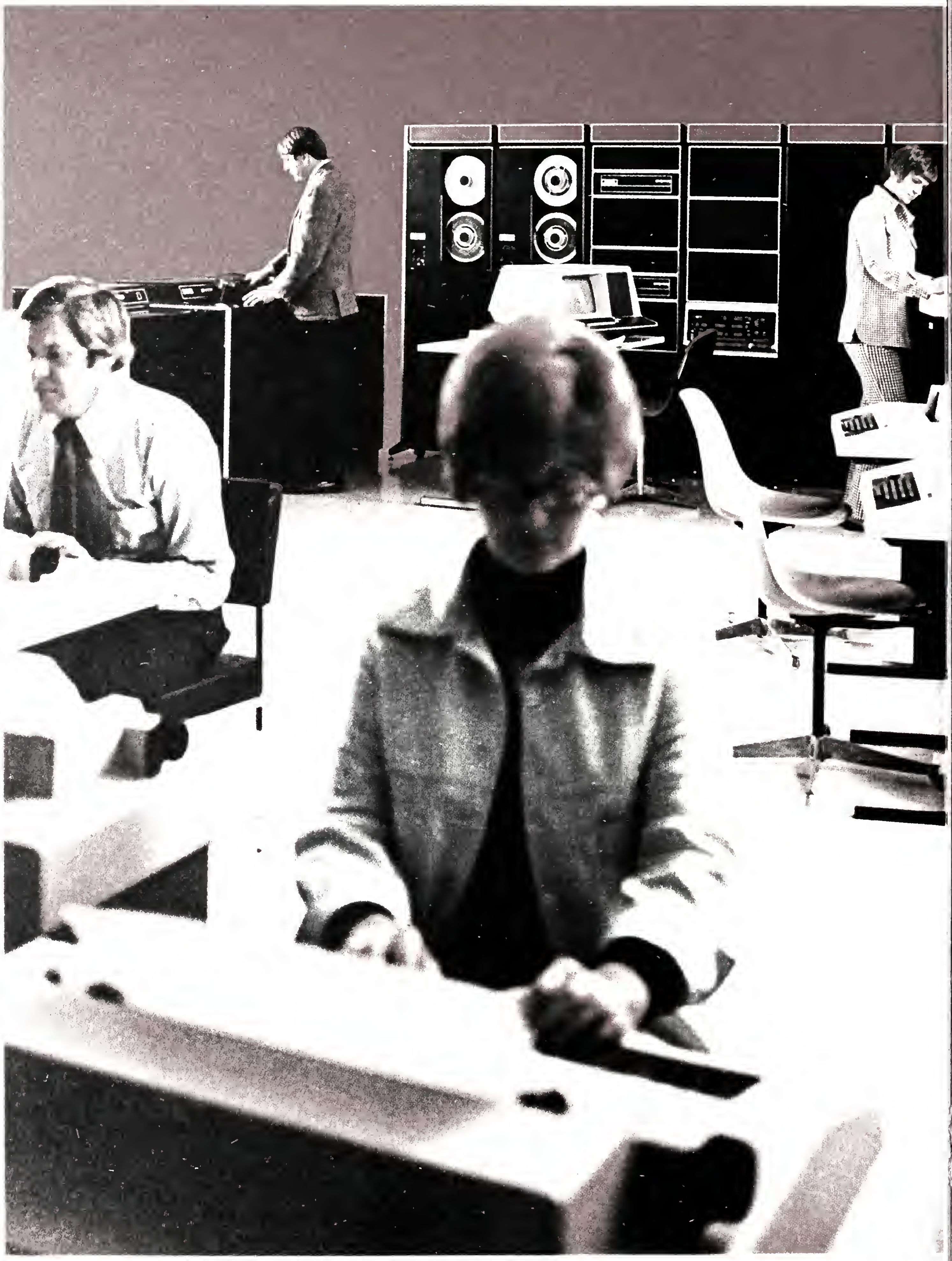
Lay one simple ground rule: accept no promise, unless and until it is in writing.

To evaluate the written proposal, take it one step at a time. First, evaluate the performance and what that vendor's machines and services will do for you. You can go to a customer of that vendor and scrutinize how the equipment and programs work there. Don't take the easy way out by simply placing a phone call.

After you have ascertained this is the system that will cut the mustard, you should then ask the all-important question: How much?

Now you must make another basic decision: analyze all costs on the basis of at least five years. Anyone comparing DP costs strictly on the basis of the figures in a proposal, which could identify cost from anywhere between one month prior to installation until no more than six months following installation of the equipment ordered,

(Continued on Page S/20)



Especially in Networks

Software/Hardware Ratio High in Mini Systems

By Lynn Mason

Special to Computerworld

The acceptance and broad application of minicomputers has been followed closely by the implementation of distributed data processing networks.

One important factor contributing to the widespread use of networks has been their cost effectiveness. In an effort to enhance the cost effectiveness, designers of mini networks sometimes take shortcuts in software development.

Shortcuts are taken because users expect the ratio of software development costs to hardware costs to be the same for minicomputers as it is for big systems.

The reality of the situation, however, is that the software development/hardware cost ratio is likely to be much higher for minicomputers.

The majority of dispersed data processing networks are successful. The few networks that fail have one or more of three traits in common.

- Control is minimal or not present at all.
- Edits are insufficient.
- The design of the data base is such that it will grow only to a certain level. The growth level is usually determined by the storage capacity of the system.

Only one of these factors needs to be present to jeopardize the usefulness of the dispersed data processing network.

Designers who bypass controls usually consider them to be useful only for verification of the completeness of a "batch" of data. Since distributed networks are on-line and data entry is performed by the persons directly responsible for the data, controls are often considered unnecessary.

With distributed networks, however, controls are of the utmost importance. An incomplete data set may go undetected until someone complains. "We submitted that invoice two months ago. Where is the check?"

Complaints of this nature do nothing to better a company's image and do even less for a system's credibility.

The approach to control of a network should be the same as the technique used for control of more conventional systems. Controls in networks are no more difficult to utilize and should be a high priority function.

Edits are usually a different story. They are usually present, but only in a cursory fashion. In an order entry system the customer number and part number may be verified, but the unit price is assumed to be correct.

An order acknowledgement may be sent out with a $10 price tag on a $100 unit. When the salesperson discovers that one, the old credibility gap will widen again.

The ability to complete edits is partially dependent on the capabilities of the hardware. If it costs extra to do thorough edits, the price should be paid.

Effective edits and controls are not that expensive, but in a cost crunch they will probably be the first thing to be trimmed. Why reduce them in the first place? If the network is to be successful, they will be added later.

Data Base Considerations

While controls and edits are critical to the day-to-day operation of a network, the data base design is important to the long-term success of the application.

Many data bases have a limited growth cycle because of restrictions inherent in their design.

Going back to our order entry system, the design may require that the entire customer data base be present for operation of the system. A more sound approach might be to design the system so it would operate with only a portion of the customer master on a single system.

As the customer base grows, additional hardware systems could be added to alleviate capacity problems. The processing could then be done, for example, on a regional basis.

In the heyday of the large mainframe, DP practitioners depended on the vendors to develop larger and larger machine capacity. Can we depend on mini vendors to expand capacity on a continuing basis? Can we expect them to do it at exactly the right time?

Distributed data processing networks are a valuable tool to business when properly designed. They usually cover a large geographical area.

However, it is more difficult to correct errors in a network and it is more difficult to determine completeness of data sets. Good edits and controls will save many hours of grief for the designer and the user and these steps are well developed and easy to adapt.

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'People-Driven' System Involves Non-DPers in Net

NASHVILLE, Tenn. – A retailing organization here calls its distributed processing net using minicomputers a "people-driven" operation.

Service Merchandise Co. has made a real effort to involve noncomputer professionals in DP, putting a major portion of the performance burden at the local level, according to Roger Lancina, special projects manager.

This was not always the case. Previously, one minicomputer connected to a host computer served the firm, which runs catalog showrooms in about 11 states [CW Dec. 24].

However, the emphasis has changed, and now the $200 million firm has installed 11 Micos minicomputer systems from Minicomputer Systems, Inc. in its showrooms and expects to have 17 more stores equipped with the Data General Corp. Nova-based systems by the end of the year. The stores are scattered over the Southeast and Midwest, Lancina said.

"Shifting the responsibility to the showrooms has accomplished two goals," Lancina said. "First, it gives the showroom manager a real voice in operations, rather than being a simple-minded 'slave' to the host computer, which is typically the case.

"We think this is important because each outlet is a good-sized, dynamic business of its own and the people running it have to be strong.

"Second, a computer in the retail location permits the host computer to act with great confidence in servicing that location and the entire chain."

Up to 24 CRTs can be connected per showroom in the computer configuration. Eighteen of these are available for cash registers, and the others are placed at various key points in the showroom and its contiguous warehouse.

Orders are taken at the cashier-operatored CRT stations, where the local computer is queried as to the availability of an item in the warehouse. This triggers the process of securing the product for delivery to the customer on the spot and the updating of inventory data.

Every night, a system in Nashville, also a Micos mini, polls each showroom system in turn, taking about 15 minutes to secure the details of every transaction at every register. These detailed reports, which include coded inventory numbers, are then processed by the host Honeywell 2060.

The host can update inventories of the central warehouse here, determine what goods to ship to specific showrooms, decide what goods should be reordered from suppliers and what orders might be delayed or canceled and make other similar decisions.

The nightly reports also provide a financial picture, including the cash situation at each showroom and credit card company billing data.

The Nashville system also transmits file update data to the various showrooms, most typically on price changes, new items and discontinued items.

The network development took place under actual conditions, with particular emphasis on a complete cash and inventory control mechanism, Lancina said.

This upgraded system was installed in three Georgia showrooms early this year, where personnel were encouraged to make suggestions, pick out errors and not stand on ceremony with the DP professionals from Nashville. They did just that and "helped immeasurably in the refining and completing of the product," according to Lancina.

Portable Mini Relieves 370 Of Batch Work

INDIANAPOLIS – A portable system here is taking the heat off of Stokely-Van Camp, Inc.'s IBM 370 downstairs.

The IBM 5100 is being used in the financial and budget departments at the fruit and vegetable packaging firm to handle a variety of applications not available from the batch system, according to J. Ronald Summers, corporate director of budgets.

The system performs volume price and cost analyses for the firm's divisions.

"Basically, we're now able to handle a variety of financial and budgetary projects so time-consuming they would be prohibitive to do by hand," Summers said. "And for us they are not feasible to do on our larger computer." The computing power can now be given to the individuals who need it, he added.

The system with 32K of memory, a printer and an auxiliary tape drive cost the firm $20,600. It is being used by the tax department to explore various trading strategies in the soybean oil futures market and to calculate outlays for capital investments, he said.

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Mini/Micro COMPUTER CONFERENCE AND EXPOSITION

A Major Computer Conference in a Major Computer Market

October 19-20-21, 1976
Brooks Hall/Civic Auditorium, San Francisco

Conference Program

Tuesday 9:30 - 12:00

1. LSI MEMORY

Semiconductor memory technology is having a dramatic effect on user software design decisions and overall system costs. This session will address those effects.

Organizer Dan M. Bowers
Mini/Micro Systems

2. MICROCOMPUTERS

A tutorial session designed to get managers and neophyte designers acquainted with the microcomputer revolution

Organizer: Manny Lemas
Microcomputer Assoc.

3. MINICOMPUTERS

A tutorial session designed to acquaint users, managers, and neophyte systems designers with minicomputers.

Organizer Tom Sherrard
General Automation

4. PRINTERS

This session will address line printer selection, criteria, maintenance, use and the major differences in line printer technologies

Organizer: Don Bowman
Hewlett Packard

Tuesday 1:30 - 4:30

5. MEMORY PERIPHERALS

Mass memory peripheral advances will have significant influence on the direction of future system designs. This session will address their advances and the issues which users face.

Organizer: Bill Frank
Pertec

6. MICROCOMPUTER SELECTION CRITERIA

Any potential user of microcomputers faces the decision of whether to build a special system from chips or use a packaged microcomputer. This session will help users make that tradeoff.

Organizer: Robert Van Naarden
Digital Equipment Corp.

7. ADVANCED MICROCOMPUTER FUNCTIONS

Exploring new microcomputer chips for complex arithmetic, I/O and Data Communications system functions.

Organizer: Alan J. Weissberger
National Semiconductor

8. THE 1980's – USER CONSIDERATIONS AND CONCERNS

Users and industry experts look to the next decade, and make their predictions on available products and problems on reliability, delivery, programming, costs, personnel considerations and other concerns.

Organizer. Ed Bride
Computerworld

Wednesday 9:30 - 12:00

1. INTERFACING THE ANALOG WORLD

The challenges of interfacing the analog world to mini and microcomputers so they can do useful work.

Organizer Larry Brown
Calex

2. MICROCOMPUTER & MICROCONTROLLER INDUSTRIAL APPLICATIONS

Most industrial applications call for efficient solutions to unique, but low volume, problems. The papers in this session will describe how micro computers can be used in these situations

Organizer Doug Cassell
Control Logic Corp

3. MINICOMPUTER MAINTENANCE

Maintenance has become a vital user concern in the application of minicomputers. This session will address the maintenance issues confronting a potential user of minicomputers in a panel discussion format.

Organizer: Tom Winker
Hewlett-Packard

4. MINICOMPUTER DISTRIBUTED PROCESSING

Exploring the use of minicompuers for distributing processing to achieve fast, more reliable, locally controlled processing

Organizer D.C Zatyko
General Automation

Wednesday 1:30 - 4:30

5. OEM PERIPHERALS IN END-USER SYSTEMS

Exploring the trials and tribulations of using peripherals supplied by outside manufacturers from both the suppliers and user's viewpoint.

Organizer Jordan Backler
Digital Design

6. MICROCOMPUTER APPLICATIONS

An exploration of the problems involved in applying microcomputers to totally new application areas for computer technology.

Organizer Jerry Ogdin
Microcomputer Techniques

7. MINICOMPUTER DATA BASE MANAGEMENT

Data Base management capability is a relative newcomer to the minicomputer market. This session will concentrate on how to use DBM packages and what these packages can actually do

Organizer Fred Gibbons
Hewlett-Packard

8. MILITARY MICROCOMPUTER APPLICATIONS

An all-day session on military applications of microcomputers focusing on the special nature of military requirements, standardization and procurement.

Organizer Joe Genna
Delco Electronics

Thursday 9:30 - 12:00

1. MINICOMPUTER MANUFACTURING MANAGEMENT SYSTEMS

The manufacturing management session will investigate the techniques and benefits of computerized manufacturing management (MRO) A case history of a complete on-line manufacturing management system implemented on a minicomputer will be discussed The costs-versus-benefits and the process of evaluating and selecting a computerized manufacturing management solution will be analyzed

Organizer Sandy Kurtzig
ASK Computer Services

2. THE NEXT GENERATION OF COMPUTERS

Will it be a generation of computers or computing? Panel discussion

Organizer Jon David
Systems RDI

3. FINANCING A GROWTH COMPANY IN TODAY's ENVIRONMENT

A session exploring the difficult task of multisource funding for today's high growth high technology companies

Organizer Christian C E Hobich
Hobich Venture Managmeent

4. MINICOMPUTER RELIABILITY

Distributed data processing and on-line data collection systems increase the importance of 100% computer reliability This session will address the fail safe aspects of this problem.

Organizer Arnold Keller
Infosystems

Thursday 1:30 - 4:30

5. SMALL BUSINESS SYSTEMS

Minicomputers are being applied to small business applications never reached by large computer systems This session will address what a minicomputer based business system can do today and will do tomorrow for small businesses.

Organizer Don Schnitter
Basic/Four Corp.

6. COMPUTER LAW

Organizer John Kirkley
Datamation

7. THE COMPUTER HOBBYIST

The exploding microcomputer business has created a new hobby – microcomputers. This session will address the needs, contributions made, and problems encountered by computer hobbyists

Organizer Adam Osbourne
Osbourne Associates

8. MICROCOMPUTER DEVELOPMENT TOOLS

An all-day, two-part session covering both hardware and software development tools for microcomputers

Organizer David Millet
NEC Microcomputers

Conference Program Chairman Robert J Frankenberg (Hewlett-Packard)

Notes:

(1) Thursday is also "Paper Day," consisting of a series of papers that are not necessarily related

Organizer Dr L A Lotito
Varian Data Machines

(2) Each session consists of 3-6 authors/panelists.

Exhibitors

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For More Information. Robert D. Rankin, Managing Director MINI/MICRO COMPUTER CONFERENCE & EXPOSITION
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Minis, Satellites Cut Marine Corps Turnaround 300%

By J.G. Hanks
And A.H. Ingram Jr.
Special to Computerworld

CAMP PENDLETON, Calif. – A distributed processing system using a minicomputer host linked to military minicomputer satellites and medium-scale systems is credited with reducing turnaround time about 300% over the previous methods used at the Marine Corps Tactical Systems Support Activity (MCT/SSA) here.

The MCT/SSA Computing Facilities (MCF) system is a network of military and commercial computers which provides tactical systems program development capabilities.

The military computers, Univac AN/UYK-20, AN/UYK-7, CP-808 or CP-890 host CMS-2 operating systems and are satellites to a Digital Equipment Corp. PDP-11/70 supermini which is the central network controller and provides I/O spooling, job scheduling and other I/O services for the network.

Jobs are entered into the MCF system through a DEC PDP-11 spooled card reader or other input devices and are routed by job scheduling via the PDP-11/70 to the satellite system.

As jobs run concurrently, one per satellite computer, all line printer output is spooled for eventual printing. At the same time, multiprogramming and real-time applications may occur on the PDP-11/70.

The system is designed so little modification is made to the existing military computer software. The PDP-11/70 is linked to the military computers using Navy Tactical Data Systems (NTDS) interfaces.

The Standard Navy Compiler Monitor System (CMS-2) operating systems treat the intercomputer link as an I/O channel having a card reader, a card punch, a line printer and tape drives. A PDP-11 device driver package is included in the military computer software, effecting the network line.

By servicing the NTDS requests that are made by the satellite computers, the PDP-11/70 controls the network.

The hardware configuration of the network computers is flexible. The model of the PDP-11 and the input/output devices it uses are widely variable. The choice of hardware attached directly to the satellite computers is also flexible.

The MCF system software is a set of programs that operate under the RSX-11D Version 6B real-time Executive on the PDP-11/70. The functions of these programs are:

- Input spooling/job batching. Disk-based card-image files are created from card decks representing MCF jobs by a modified RSX input spooler program. The input spooler passes the files to the MCF batch monitor program which initializes and queues the jobs for execution. The batch monitor also accepts input files (representing jobs) specified by an operator command.
- MCF Executive. This performs operator communication and overall control of the MCF system. Some functions of the executive include system management, communicating with active jobs, configuring the devices in the system and displaying job and system status.
- NTDS device handlers. NTDS communication with the military computers is accomplished by standard RSX-11D device handler tasks. There is one handler task per satellite computer.
- MCF Service programs. All satellite computer I/O requests are serviced by

(Continued on Page S/18)

Cost Savings Cited In Conglomerate's Distributed Net

By J. Keuller
Special to Computerworld

BRUSSELS, Belgium – Five years ago when we established our company, a management decision was made that only centralized computing was to be used.

However, we are now leaning toward decentralization with an IBM 370/125 aided by 10 satellite minicomputers from four different vendors.

Societe Belge D'Etudes et de Realisations Informatiques SA (SBERI) will be five years old on Oct. 1. It is a member of the Empain-Schneider (E/S) Group, an industrial conglomerate of more than 200 firms whose consolidated turnover exceeds $5 billion.

Within the E/S Group, our company acts as a DP service bureau with over 60 firms, mostly Belgian, as clients. We have been pleased with the cost savings the distributed network has afforded us.

One of the minis in the network, an IBM 3/8, is used by a piping contractor for data collection and validation applications.

A cardboard factory uses a Digital Equipment Corp. PDP-11/40 to record production data via 11 RT02 terminals. The system is also being used to control customer order flow. The factory is scheduled to soon implement a production scheduling application to optimize its cuttings.

A Honeywell 61/60 is installed in a bank where it collects data and produces daily statements of accounts. An engineering contractor uses three DE 523s from Olivetti as data encoders or remote job entry (RJE) workstations. Another Olivetti machine, a DE 525, performs order processing and inventory for a small pharmaceutical company.

Five MTS 7500s from Honeywell are being used for personnel management; customer order servicing is planned for the systems.

Although all the installations are completely independent and different in almost every respect, they share two things in common. First, they were designed after a thorough feasibility study and implement by the SBERI team. Secondly, communications with the central computer has been standardized by IBM 2780 emulation under Power/VS/RJE.

As a result, the move toward decentralization was easy: it is not exaggerated to say it has been a success.

Like everybody, we suppose, we have encountered some problems with the communications lines. We mainly use ordinary leased 4,800 bit/sec lines.

Problems have also occurred with the software and, in particular, the emulators and with the RT02 terminals.

But they seem like trifles when dealing with success.

Sci-en-tif'-ic: eminently learned or skillful
Busi'-ness: any of the various operations or details of trade or industry
Sys'-tems: orderly combinations or arrangements of parts, elements, etc., into a whole

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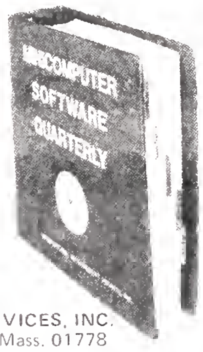

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Star-Shaped Network Fits Wholesale Decentralized Pharmaceutical Facility

By Hans J. Loge

Special to Computerworld

Messrs. F. Reichelt AG is a pharmaceutical wholesaler in northern Germany with a decentralized organization. The company's head office is in Hamburg; sales offices and depots in 11 other towns are controlled by the head office.

A network including the hardware of different manufacturers (Univac, Honeywell Bull, Olivetti) was developed to handle the order entry and processing in the sales offices and the commercial and organizational functions in the head office of the company.

The total system was designed in 1973 and brought step-by-step into operation from 1974 to 1975. The goal was to develop an economic solution that met the company's needs for reliability and security and also requirements regarding the response time of the system.

The overall design is based on a star-shaped data network with private lines (4,800 bit/sec). In the center of the network (Hamburg), the central processing unit, a Univac 90/60, is installed.

The CPU performs invoicing, ordering and central file maintenance, as well as all the other classical DP functions.

Each of the sales offices, which represent the end points of the network, is equipped with a Honeywell System 700 minicomputer for order entry, inventory reporting and preparation of delivery notes, with one Olivetti on-line printer for backup.

Univac display units can be connected directly to the line. All devices use the Uniscope 100 line procedure in multipoint connection.

Each System 700 uses its own customer file (of about 1,000 customers) and article file, the latter containing the stock quantities which are updated in real-time. The files are loaded by the central processor via the line and updated (such as in the case of price changes, new entries, etc.).

Each minicomputer has two to 12 high-speed displays for the input, identification and booking of the order data according to quantity and article name.

The display units are operated by telephone operators who call up the customers up to four times daily, according to a fixed schedule, and type the order directly into the System 700 via the displays.

To avoid any cost increase, a response time of less than .5 sec was required for the display units, and this was achieved.

The order data is temporarily stored in a buffer file and sent to the central processor for invoicing and discounting when input is completed. After these functions have been carried out, the central processor returns a picking list which is sorted in the picking order of the warehouse. The picking list is also the delivery note and invoice.

To perform the order collection functions with the System 700, Honeywell Bull Germany created a software package, PBS, with the collaboration of Reichelt.

Based on the real-time operating system OP-16, a screen-oriented software pckage, Bisop, was developed. This allows the writing of application software in the high-level language Screenwrite.

In addition to the actual order collection, PBS includes a comprehensive reliability concept which allows for continuation of order entry even when a system component fails.

For example, the order entry and output of picking lists are possible even when there is a problem in the connection between the System 700 and the host system or a failure in the host system itself.

Loge is with Honeywell Bull systems support in Eschborn, West Germany.

Whither Minis? The Squeeze Is Coming

(Continued from Page S/7)

gard to computer size: batch and remote processing, transaction processing and time-sharing.

With the right kind of software, a minicomputer could compete very well in all of these functional markets, although minicomputers generally are more at home in the real-time, interactive world. Thus, they generally do transaction processing and time-sharing well.

More and more large banks and other corporations are discovering one way to keep computer costs from rising is to disperse computer power. New applications are implemented on minicomputers. Large mainframe computers are being off-loaded to minis.

Despite computerizing more applications, costs are not going up. Minicomputers do provide low-cost computer power. For smaller systems, operating systems can be less complex and more efficient.

This is a potentially large market for minicomputers. When a minicomputer saves money over a large mainframe for a particular application for one company, competitors look for similar cost savings. This market could snowball in the next few years.

Minicomputer manufacturers are seeking ways to market to their natural customers, small businesses. The computer is the right size, but the minicomputer manufacturers' marketing and sales support forces are too small.

Some mini manufacturers have essentially extended their marketing and sales support forces by using local system houses as sales representatives.

The problem of maintaining quality control over such widespread independent businesses has yet to be solved. The reputation of a particular minicomputer manufacturer will tend to be that of the local representative.

Users will reap the benefits as minicomputer manufacturers answer these questions. Minis have been a major factor in bringing the cost of computing down to a price affordable by small businesses.

They have also allowed sharp DP managers to stabilize computing costs in the face of inflation and added applications.

It is largely minis that have made terminal-oriented, interactive processing possible, freeing users from the inflexible straitjacket of the batch world.

Thus, as the minis move out into the micro world, users can expect even more cost reductions. Minis in networks will guarantee that small networks can be set up without investing millions of dollars. Minis in the commercial world will force the large mainframes out of the batch world.

Bartik is product manager for high performance CPUs at Interdata in Oceanport, N.J. 07757.

Marines Cut Turnaround by 300%

(Continued from Page S/17)

these programs. I/O devices simulated by the service programs are card reader, printer, card punch and mag tape.

- MCF Utilities. The utilities consist of a set of off-line RSX functions supporting data conversion to and from MCF formats and a set of MCF/RSX system maintenance procedures and programs.

Data flows through the system from card decks representing MCF jobs which are read on the PDP-11 card reader or remote job entry (RJE) terminal command and transformed by the input spooling task into a job input stream file.

The job input stream file is analyzed by the MCF batch monitor, which creates the job's log file. During the service program execution, input data consists of NTDS communications messages from the satellite computer, operator messages and control information from the MCF executive, the job input stream, log and previously created simulated tape files on the PDP-11 disk.

Output data consists of operator console messages, NTDS communication messages to the satellite computer and listing, log and simulated tape files.

When the service program detects the end of the job, it (optionally) queues the listing and log files for printing by the RSX output spooler task. These files are then printed on the PDP-11 line printer.

Normal end-of-job processing may include deleting the job input stream, listing, log and any simulated tape files as designated by the user through MCF job control language (JCL).

Hanks, a captain in the U.S. Marine Corps, is with MCT/SSA at Camp Pendleton, Calif. Ingram is with Rockwell International's Marine Systems Division in Anaheim, Calif.

Power Choses Mini Power

In-House System 'A Fraction' of Time-Sharing Costs

By Esther Surden
Of the CW Staff

SCHENECTADY, N.Y. When an electrical utility consulting firm here overloaded its time-sharing vendor's mainframe, it decided to look at minicomputers as an alternative for its number-crunching applications.

That was in 1972, according to Power Technologies, Inc.'s senior engineer, Richard Mills. The company realized the amount of work it had been running on the time-sharing service's IBM system could run on minicomputers for a "fraction of the cost we had been paying."

Many minicomputers were considered, Mills said. However, at that time, the Hewlett-Packard (HP) 2100 system seemed to have "the best software for the applications."

The disk operating system was "impressive," he added, explaining his company didn't need proficiency in real-time applications but rather good time-sharing and batch capabilities.

The three HP systems, however, are on their way out and will be replaced by two systems from Prime Computer, Inc. that are already installed at Power Technologies.

When the company needed to expand its capabilities, it found out about the Prime systems through word of mouth, Mills said. Tests run on the prime 300 and 400 systems showed they would be better for number crunching, he explained, and one of each was obtained.

At present, all five systems are being used by the company. The HP minis are connected to one of the Prime systems through RS-232 ports for accounting functions with the Prime mini keeping track of the time used for the different applications on each.

Otherwise, the systems are stand-alones and none is dedicated to a particular job, Mills said.

The minis are used in two primary application areas at the company. The first is to study stability, load flow and, in general, long-term planning for electrical utility companies. These programs involve the heaviest number crunching, he said.

The second use is in program development for the utility industry on a contract basis. The company also offers specialized industry application packages it develops on the minis for sale to the utilities.

"The only reason we still have the Hewlett-Packard systems is that the software hasn't all been converted to run on the Prime," Mills explained. When it is, the Prime minicomputers will carry the company's entire processing load.

The configurations for the HP minis are all alike. Each has 32K words of memory, 5M bytes of disk, a CRT, console, paper tape reader/punch and a plotter as well as Digital Equipment Corp Decwriters.

Each Prime configuration has a total of 224K words of memory, two 12M-byte disks, and 32 ports for user terminals; magnetic tape, a line printer and an electrostatic printer/plotter are "juggled between the CPUs depending on the applications," Mills said.

The five systems represent a total hardware cost of about $300,000, he added, an economical solution to the company's problems.

The firm's business requires large programs that take a lot of core to run. "It's hard to call the Prime 400 a mini," Mills said. "It can accommodate up to 8M bytes of main memory and 1.2G bytes of disk, and we will expand the system to take care of our needs."

For example, the company is in the process of developing a stability and load flow program. This program will run on the Prime 400 which will be outfitted with 1M words of core.

"This may be the only 16-bit mini around that will allow you to do this," Mills said.

Reliability on the systems has been good, he added. The Prime minis are serviced from that vendor's Framingham, Mass. home office.

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HACKENSACK, N.J. – "Where's the truck with my order?" "I need a couple of cans of wax, do you have them in stock?" "Hey, how come I received an overdue notice. I just paid my bill."

Customers telephone such inquiries into the Hackensack, N.J., office of John A. Earl, Inc., a distributor of janitorial supplies.

And, until recently, the reply was "I'll have to call you back."

What changed all this was an NCR Century 8200 mini run under the NCR Spirit on-line order entry system.

Customer, order and inventory records on a master file are immediately accessible, according to the user.

Indexing a single order number into the keyboard of a visual display terminal, for example, produces a response as to whether the items have been picked, shipped or invoiced. At another time, an item number entered through the CRT will display the status at that moment of any one of the firm's 3,500 products in stock.

The system also prompted changes in warehouse management. Stock has been assigned permanent, sequential bin locations, simplifying physical inventory taking and almost eliminating dead items, according to Tony Crisafulli, operations manager.

Another benefit of the system is that, by knowing what is on hand, available and on order at all times, the company, barring unforeseen circumstances, is able to fill orders as they are received.

The firm, which serves more than 2,500 customers in New Jersey and parts of New York City and Long Island, had determined for some time that a change was in order. But matters did not become critical until after a couple of supermarket chains became customers, and sales increased 15% in a year to $2.5 million.

"We were at a point where sales were getting better, but operations were staying at the same level," Crisafulli said. "There was too much paperwork and it was either increase people or take another route."

The company chose the system after considering the IBM 3 and minicomputers from Basic Four Corp., Singer and Nixdorf. It seemed to give more of what we wanted without needing a programmer," Crisafulli noted.

The only change was in reporting sales commissions, he noted. The report, available at any time, enables the company president, Donald B. Earl, to pinpoint errors and determine each customer's contribution to sales and profits.

The sales force is given similar figures and, when matched to picking tickets and invoices also generated by the computer, they can figure commissions and profitability, Crisafulli added.

Order entry clerk "runs the company" through the NCR Century 8200 at James A. Earl, Inc.

An order entry clerk, given only a few hours of on-the-job training, is led through each transaction, selecting the functions and entries from instructions displayed on the terminal screen. The computer verifies each entry, rejecting any incorrect data, Crisafulli noted.

After the orders have been entered, the computer prints picking tickets and packing slips. The orders are filled in the warehouse and, after shipment, invoices are printed.

Once orders, payments, stock receipts and similar information are captured on the computer, any number and variety of reports are available. These can include a credit exception report, an out-of-stock/below minimum listing and a summary of back orders, among others.

Eventually, accounts payable, general ledger, sales reporting and route analysis will be incorporated into the system, he added.

Applications Seen Key to Minicomputer Successes

(Continued from Page S/12)

shouldn't feel too insulted if he is called a fool.

A typical gimmick so successfully used by computer vendors is to hide the costs for personnel prior to installation of the computer.

The items that need to be included in the total DP cost are:

- Cost of the equipment (including auxiliary equipment such as data recorders).
- Cost of hardware maintenance
- Cost of programming.
- Cost of program maintenance.
- Cost of computer operation.
- Cost of facilities.
- Cost of conversion.
- Cost of ongoing management support.

Each and every one of the above listed items does generate a cost; don't be lulled into believing some of those categories do not apply to you. There has been more than one overeager computer salesman who has been successful in making the buyer believe the cost of programming is incidental and insignificant.

Clearly, complex problems require the services of people trained to handle the problem in question.

How will a user know the DP expert he is turning to is qualified to do the job? Frankly, unless the firm he is contacting has unimpeachable credentials, he is on his own again. The only defense he has is a contract which guarantees results which he can measure unequivocably prior to having to hand over his hard-earned cash.

Of course, to stop the passing of the buck it is highly advisable to deal with one source only for all of the necessary services. The user should make one other basic policy decision: deal with only one organization which will supply all products and services.

Dinter is president of Computer Management Corp. in Miami.

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In Distributed Processing

Micro Dreams to Come True Soon

By Ralph Gabai

Special to Computerworld

CHATSWORTH, Calif. – By the end of this decade, those far-fetched dreams of computer industry pundits of the late 1960s will actually be coming true. By then, microcomputer-based systems will be in use in hundreds of applications where mechanical devices are now supreme.

And by 1984 the microprocessor and its mini peripherals will be used in applications that even the bluest of blue-sky reports haven't yet predicted.

Why should applications that were expected in the mid-1970s finally bear fruition at the end of this decade?

First, there is the plunging cost of intelligence – the chip itself. Second, there is the new breed of peripheral equipment, which is also dropping in cost – though not as quickly or drastically as the microprocessor. Finally, there is the acceleration of user imagination. In recent years, end users have gained greater understanding of how and what they can do with a computer.

This latter trend is documented by the birth and sudden emergence of the computer retailing establishment. Across the country, there are approximately 25 stores selling microprocessors and peripherals to individuals who work in some technically related industry, but not usually the computer business.

During this year, these retail computer systems customers will buy $15 million to $20 million worth of products alone. Not a large amount, but indicative of the mass interest in computers.

That interest is clearly evident today in such industrial application areas as small business machines, process control, automotive, test equipment, word processing, nonmilitary governmental use and medical test and application.

Small Businesses Untapped

Take, for example, the small business. The minicomputer specialists define small businesses as firms with 20 employees and up doing sales of $500,000 and up. That eliminates the prospect of designing systems for 90% of what are truly small businesses – all the retailers and service operations that are in the $100,000-plus range.

Now, however, the microprocessor makes it possible to design systems for small business users and to gear peripherals as easy-to-handle tools for noncomputer people.

When it reaches a point where one can buy a computer system fully programmed for $3,000, is it inconceivable that an independent dry-cleaning operation will have one in its place of business? Or isn't it logical that the inventory-intensive merchants will have small systems linked to their suppliers?

Clearly this makes a distributed network critical in areas such as books, phonograph records, fashion merchandise, hardware and building supplies and thousands of other similar types of businesses.

There is a need for terminals, disk drives, data collection devices, noncompatible low-cost tape and modem communications, all at lower prices and all human engineered so they can be utilized by a nontechnical user in a real-world environment.

According to industry studies, peripheral content in microprocessor-based systems is currently half the equivalent sale price of the system, but is expected to increase to up to 80% over the next five to 10 years.

Distributed Processing

Let us take the example of a distributed processing application. As the cost of computer intelligence continues to drop, it becomes logical to increase the level of computing power at the source location. The availability of this hardware is more than a component in the distributed processing chain, it is a catalyst that makes distributed processing grow.

The greater the use of microcomputers for distributed processing, the more the prices will come down, including the cost of peripherals. And, as prices drop, the more applications will become practical. The more applications that become feasible, the more use of small computers. And, the more computers in the field, the more opportunity to link them to a host computer, thus producing more distributed processing.

To reach this stage, the market will need to get by with as few peripherals as possible and as simple a peripheral as feasible. Often, microprocessor peripherals will be combined. Office products that are not now considered computer peripherals will be engineered to do double duty.

Within 10 years, word processing systems will be affordable by every office of almost any size in the country. Those systems will have essentially this same capability of today's $10,000 to $30,000 word-processing system, but prices could easily be 50% to 60% lower.

In most installations, this will create a new future for tape and disk storage, but in larger applications one host machine will control many satellite microprocessors and printers in a distributed mode.

Gabai is vice-president of marketing for Pertec Corp.'s Peripheral Equipment Division in Chatsworth, Calif.

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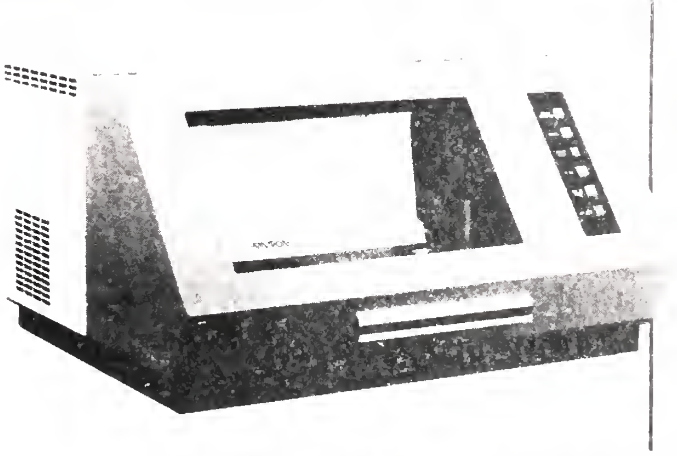

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Mini Bits

Signal Processor Features Smart Memory Architecture

WALTHAM, Mass. – Compass from Signal Processing Systems, Inc. is a minicomputer-based signal-processing system featuring an enhanced memory architecture, the firm said.

The system's memory is composed of several separate modules of different sizes and speeds, but is viewed as one homogenous memory by the signal processor, a spokesman noted.

The memory architecture includes control logic that handles the synchronization of tasks between multiple processors, he added.

The system includes software that permits multiprocessor programs to be written in Fortran, the firm said.

A basic Compass system includes a minicomputer interface, an SPS-41 signal processor and 8K of the memory. The minimum system costs "under $30,000."

Multiple processors and more memory can also be configured, the firm said from 223 Crescent St., Waltham, Mass. 02154.

Icom Offers Floppy System

CANOGA PARK, Calif. – Incom Inc.'s Model FF36-1 floppy disk system was designed to operate with Intel's SBC80/10 single-board computer, the vendor said.

The unit includes a disk drive with daisy-chain capability, an IBM-compatible controller and cables and connectors. Also provided is Icom's 360-56 interface card for the SBC80/10.

The interface card plugs into a slot in the Intel card cage and contains a software driver programmable read-only memory and Icom's disk-oriented software.

The Model FF36-1 costs $1,495. The firm is located at 6741 Variel Ave., Canoga Park, Calif. 91303.

Micro System Unveiled

DALLAS – International Computer Products, Inc.'s TD-1 Termidisk communications-oriented microcomputer is equipped with one to four standard IBM-compatible diskettes, the firm said.

The unit is designed for data collection, time-sharing computer usage and business communications, the company noted.

Communications with terminals and modems is through standard serial ports equipped with RS-232 or current-loop interfaces, according to the company.

The unit costs $2,450 from 2925 Merrell Road, Dallas, Texas 75229.

Saving $20,000/Year

Manufacturer Cuts Costs With Turnkey

By Esther Surden
Of the CW Staff

ENGLEWOOD, N.J. – A manufacturer and distributor of metal trim and fasteners for apparel here is saving $20,000/year and has increased management control with a turnkey minicomputer.

Prior to the system's installation, the company used a service bureau to handle accounts receivable and did the inventory manually.

An in-house system seemed to be the way to go to increase efficiency and minimize costs, Bernard Chalfin, the firm's vice-president noted. He attended seminars and business shows and talked to several manufacturers, including IBM, Keydata Corp. and Basic Four Corp.

The systems "just didn't satisfy the firm's requirements. So, we ended up with an Ultimacc system because the company was small enough to give us a custom system," Chalfin said.

Because "we had as one of our parameters that we didn't want to hire a systems manager," the company turned to a turnkey system, he explained.

C&C Metal Products, Inc. here supplies trim to firms using metal decorations in their manufacturing process. The decorations for the footwear industry are sold by an affiliate, Amershoe Corp., and a second affiliate, C&C Amershoe International Corp., handles export sales.

For the past 18 months, the bookkeeping and accounting procedures of the firm and its two affiliates have been run on an Ultimacc turnkey minicomputer system from STC Systems, Inc., a spokesman said.

Staying Power a Consideration

"Certainly we were concerned with the staying power of the company, especially at the time we bought during the recession, but we were impressed with the personnel and felt the company would have turned over to us the history and required software data so we could find others to tackle the service if the need arose," Chalfin continued.

The configuration at C&C includes a minicomputer with 46K bytes of core, two 5M-char. magnetic disk storage units, two CRTs and one 245- to 1,100 line/min printer. The system represents an investment of about $100,000, he added.

The firm has eliminated $800/mo in service bureau costs and has saved one salary from the order entry department representing a $12,000/year savings, Chalfin estimated. This was accomplished through reorganization and attrition, he noted, and no one was actually fired because of the system.

At C&C, Ultimacc handles all daily business transactions, including order entry and billing accounts receivable, accounts payable, general ledger, customer sales analysis, item sales and profitability analysis, inventory status reporting and commission processing.

Separate Identities

Each of the company's three corporate entities has its own company code with customers classified by type of business (jobber, belt manufacturer, shoe manufacturer, etc.) and products classified by type (covered button, nailhead, eyelet, etc.).

When the system became operational at the beginning of 1975, C&C was using 17 codes for customer categories and 23 codes for product categories, but the system can accept up to 28 customer codes and up to 36 product codes, Chalfin noted.

For the most useful processing and reporting of business information, C&C management asked the turnkey house to provide each marketing unit with its own separate identity. The system provides this capability for all major functions

C&C's typical daily entry volume of 200 orders, 220 invoices, 150 cash receipts, 100 inventory adjustments and 50 accounts payable are accommodated by the system.

One of the system's many features favored by C&C is automatic price changing, Chalfin emphasized. To increase or decrease the price of each item in any product category on the item master file, the operator need only enter the product category and the percentage of price change. The results are available by calling up an item master file listing or by displaying individual items on one of the CRTs.

The cost of each item is broken down into its various parts as well, Chalfin noted. Costs of tool manufacturing and production, secondary operations, overhead and sales commission are available for each item, he added.

"We can process an order without a computer," Chalfin noted, so if the system goes down the entire business won't go down with it. "Our prime concern is shipping, not billing," and, if necessary, the bill can be delayed a bit.

"If you had asked me two years ago

(Continued on Page 37)

Ball Unites Hardware, Software In System for On-Line Control

SUNNYVALE, Calif. – Ball Computer Products, Inc. has a minicomputer hardware/software package designed for online production and inventory control in manufacturing and distribution firms.

The Inventory Control System (ICS) includes a 16-bit Data General Corp. minicomputer, disk-based operating system and data management software.

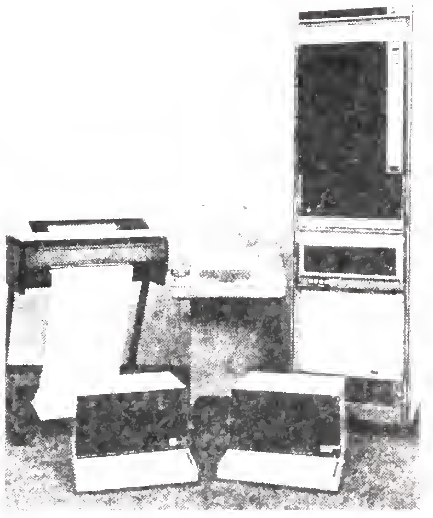
The ICS packaged software, written in the firm's Dasl language, includes programs for inventory control, net change material requirements planning, bill of materials processing, order entry, accounts receivable, payable, cash flow analysis, general ledger and budgeting, Ball said.

Multiple CRT terminals can be used to concurrently perform different functions, a spokesman noted. For example, he explained, one CRT can be used for order entry while another issues parts from a stockroom.

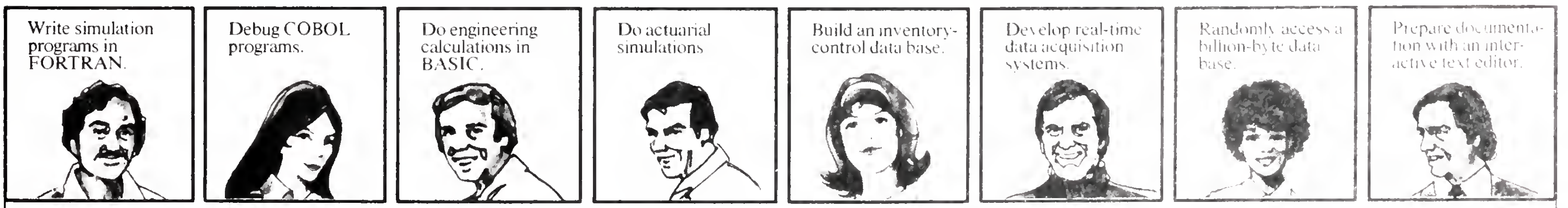
An audit trail is maintained on magnetic tape; in the event of hardware failure, recovery procedures are transparent to the user, Ball said.

The minimum ICS configuration includes a 64K mini, two CRTs, 5.8M bytes of disk and a control console with a hard-copy printer. The system can be expanded to 16 CRTs and 400M bytes of disk with additional peripherals available, the firm said.

The hardware costs $37,900, the software is priced at $8,000 with optional packages available. Ball is at 860 East Arques Ave., Sunnyvale, Calif. 94086.



Basic ICS System



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New Software Almost Always Good, But Don't Be Surprised by Problems

By Jon David

Special to Computerworld

Minicomputer Exchange

It finally works! The mini hardware, ornery at first, was finally tamed and is now well behaved. The applications programs, beautiful in concept but filled with sufficient bugs when tested to be a veritable computer plague of locusts, now work and provide subtotals that reconcile with reality.

You sit back and relax, priding yourself in being one of that small minority group with properly working computer systems.

Your salesman visits you just to check that everything's going OK and asks you if you'd like the newest software release. With all the hardware peculiarities and applications problems you were living with, you had really forgotten that there was operating system software.

Let's see, it's Version 6.03 you're working under, isn't it? And he's offering you 6.04, 7.01 or some other larger number.

This new software, offered to you for nothing, boasts many improvements and enhancements over your present software. Why in the world shouldn't you take it?

Because you've got common sense, that's why.

Most people view counting as 1, 2, 3, 4, 5, 6, etc. Not so with those people that supply system software. After 3 we find 3.01, 3.02, 3.04 (they never tell you what happened to 3.03), 3.05, 4, 4.01 and the like.

Numbers?

What do those numbers mean?

A minicomputer manufacturer provides an operating system. Needless to say, unfortunately, there are things in it that don't work quite right, things that don't work at all and things that are dependent on the phase of the moon.

The manufacturer, aware that his hardware does not make as good an impression as he feels it should if it doesn't have properly working software, issues patches, fixes and other such corrections to make his software livable.

Every so often the corrections that must be supplied with a particular version (also known as a release) of an operating system has too many corrections to be easily installed; a .01 is then born, supposedly incorporating the corrections.

Often it includes certain improvements that the manufacturer was thinking of putting in when time permitted. More often, it still doesn't work right. That's why we get .02s and .03s.

Normally the upward revisions within the same basic number should all offer the compatibility feature, but this is not always the case. Although new revisions within the same number set should be the old set plus improvements, quite often things that worked under the old set do not work with new release software.

If you think you have troubles going from 3.06 to 3.07, wait until you try the Release 4 software. This is so drastic a change even the manufacturer would not presume to use the same basic number identifier. Obviously, it is in all ways better than what you are now using.

Readers are urged to reply to this or any other Minicomputer Exchange article. This is your column, a chance for you to exchange views on the various topics confronting the minicomputer user, a chance to tell the vendors what you are thinking and to let your fellow mini users know about pitfalls or new techniques in this area. Letters or manuscripts should be addressed to Minicomputer Exchange, Computerworld, 797 Washington St., Newton, Mass. 02160. Double space please.

Just don't expect that it will work or be compatible with what you have, regardless of what anybody tells you.

Let us say that you do install new software. How might this effect your operations?

First, you may try to run your programs and discover that for some mysterious reason the new system will not recognize them; it might recognize your programs, but not your data files; it may recognize your data files; but be unable to read them.

You may get into execution only to discover that you get a system message: INSUFFICIENT MEMORY. New systems frequently take up more space than the ones they have replaced.

Maybe you will be extra lucky and your system will perform the way it should. At the end of the day you go to copy your newly updated data files and discover the system copy program, working just yesterday under the old system, no longer works with the new system.

Problems? Yes and No

Are there always problems? No. Are there frequently problems? Yes.

Are the new problems always critical? No. Are they always inconvenient? Yes.

Can they always be gotten around some way or other? No. Will the manufacturers normally help you with new problems? Yes.

Are you often better off than you were before? No.

In the past year my firm has been working with software from one particular manufacturer. We have gone from Version 3.02 to 3.03, to 3.04, moved up to 4.00 and 4.02 (note the omission of 4.01) and are now at 5.00.

We did not have upward compatibility even within the 3 series Does that tell you something?

From time to time my company provides software as either a separate product or as part of a turnkey system. We deliver such software with a lifetime guarantee. There are many conditions that must be satisfied for this guarantee to take effect.

All of these conditions are what we consider to be reasonable: we must be provided with a computer-intelligible copy of the programs we deliver to a customer; any programming change by the customer without our written approval voids the guarantee; the guarantee is only valid under the operating system in use at the time the software was delivered. Does this tell you something?

Computer manufacturers regularly change file and directory structures, utility and library routines and the like as time goes by. Although there may be many exceptions to prove it, the rule still is that new software will have problems not present in the old software. Why ever use new software?

New Better Than Old

By and large, new software is actually better than old software. If you are in a development phase, it makes sense to choose the best available, as we did.

In any event, you can frequently get what is not working in a new release from an old release. Software representatives of the manufacturers are always trained to deal with recent software, but often not with older software; the later your software release version, the more likely you are to receive prompt and competent manufacturer support should a problem arise.

New software is almost always a good thing eventually. Eventually, however, can be a day, week, month or year from when it is first delivered. If you have an operational system, avoid new software until it has proven itself.

New versions of software are sometimes necessary to support new peripheral equipment. The key word here is "necessary." You have no choice.

On the other hand, a new version may just offer enhancements where enhancements represent unproven changes to your proven operations. Indulge at your own risk!

David is president of Minicomputer Industry National Interchange (Mini), a professional society treating minicomputers, microcomputers and associated technological techniques, and is also president of Systems RDI.

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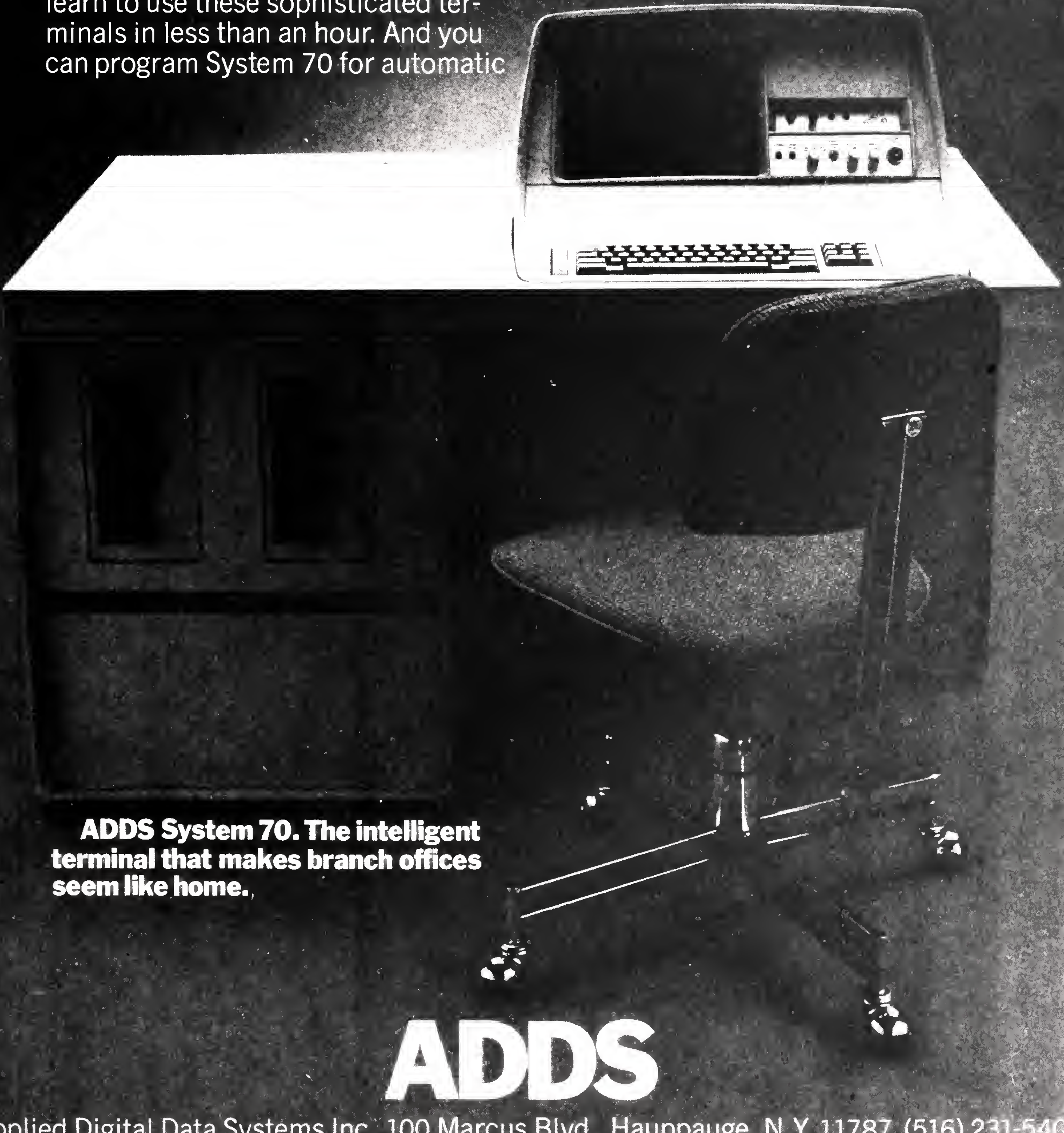
ADDS System 70 is IBM 3780 or teletypewriter compatible and has one or two IBM 3740 compatible diskette drives, plus a whole line of optional printers.

Last (and least) is the price: System 70 workstations cost under $7000 in moderate quantities. So there's just no reason why Timbuktu can't have intelligent terminals, too.



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Two at Sea, One on Land

Three Minis to Aid in Mediterranean Pipe-Laying Job

By Esther Surden

Of the CW Staff

GREAT NECK, N.Y. A company laying pipeline under the Mediterranean Sea a pipeline that will eventually carry natural gas from Tunisia on the North African coast along the floor of the Sicily Channel to the Island of Sicily two miles off the Italian mainland will have a lot of calculations to do.

Especially when the stretch of ocean bed is marked with steep peaks and valleys swept by subterranean currents.

The Sperry Equipped Automatic Navigation and Control for Offshore Requirements (Seancor) program from Sperry Systems Management here, which incorporates Systems Engineering Laboratories' (SEL) 32 minicomputers in its data acquisition and processing system will be used to control the pipe-laying operation for Saipem SPA, an international contracting firm headquartered in Milan.

Three-Mini System

Two of the minicomputers will be shipborne on the Castoro VI, a twin-hulled and semisubmersible pipe-laying vessel. A third mini will remain on shore for program development and backup, according to Jerold Mann, program manager.

The systems will control the pipe-laying operation by allowing the pipe to be laid continuously in water as deep as 2,000 feet, with winds up to 50 knots, water currents of two knots and wave heights of 17 feet, Mann said.

The system is in charge of the launching of the pipe on the assigned route and will control the shifting of the vessel in order to keep all possible movements within the limits of allowable stresses in the pipe, as well as to obtain an easy and safe launch operation, he noted.

The system will also control the equilibrium of the barge during the pipe settling and during stationary operations, considering such variables as environmental forces, pipe pull and any mooring line forces whose anchors are being lifted and shifted.

"The main problem in laying the pipe is holding the barge in position while the construction, or joining of the pieces of pipe, takes place. When a new piece of pipe is laid, the barge automatically moves forward," Mann said.

The SEL 32 minis are 32-bit machines with 64K words of memory each and have 40M bytes of disk, magnetic tape, a card reader, line printer and a Teletype input, Mann said.

The CRT console is located in a room above the surface on the bridge. Two operators monitor the status of the operation and only make changes when something is not quite right.

"If everything goes all right, the peripherals are not used" with the exception of the disk drive and the printer for necessary operations, he noted.

The second on-board minicomputer will be used as a backup system in case of failure and by shipboard personnel for off-line computations on other aspects of the barge's operations, he explained.

Benchmark Decides Vendor

The firm considered several different vendors and both 16-bit and 32-bit machines before deciding on the SEL system, Mann said.

The final decider, besides price, was a benchmark test. A criterion for the system was that programming could be done in a high-level language.

The SEL system performed well on the Fortran benchmark and, because the 16-bit machine would have to go to double precision, cutting into the system's accuracy, the SEL system was chosen, Mann said.

He added that the analog-to-digital converter and other gear necessary for the operation was supplied by SEL, making "the hundreds of inputs and outputs that have to be coded and converted" in a system like this more easily interfaced.

Cabinet Maker Using Portable CPU to Solve Estimating Problems

ENUMCLAW, Wash. – The dual problems of managing growth and increasing product quality in the casework and cabinetwork industry are being solved at Ly-Line Products, Inc., here with a new, portable computer, according to the user.

"We are using our new computer, an IBM 5100, for job estimating and soon will use it to relieve product engineers of tedious, repetitious manual design calculations," Hugh Lyman, president said.

The five-year-old, $2 million-per-year company tailors its products line to the specific needs of the school, university, hospital, office or institutional use its customers define.

"Precise estimating is an absolute necessity," Lyman said. "There are more than 30,000 possible sizes, styles, types and models in our line.

"And, despite constant fluctuations in labor and material costs, we must respond to bid opportunities with the most precise, timely and accurate information we can prepare."

The bulk of Ly-Line items are made of particle board laminated with high pressure plastic surfaces and plastic polymer edgings. The resulting assemblies are used in cabinets, counter units, multiple-user drawer storage units, files, shelves, screens and mobile cabinets.

"Product engineering is a second vital area in our business," Lyman observed.

"Mistakes have a direct bearing not only on profitability but also on the amount of money we have to invest in raw material and work-in-process inventories.

"We are developing our engineering program carefully so that we use the computer to calculate those elements of a build order which are standard, but leave to our engineers the calculation of nonstandard, one-of-a-kind requirements."

Ly-Line is located in suburban Seattle but markets its products nationwide.

Profligacy repealed:

Read our special report on *Supplies and Security* in the September 27th *Computerworld*.

Harry S Truman, in his oft-quoted phrase on our improvident ways, admonished us to "Use it up, wear it out, make it do, or do without." As much as it made sense to the sugar-saving housewives of 1946, that wartime motto is excellent advice for the computer rooms of today. Our September 27th supplement, titled *Supplies and Security*, takes that advice, and we'll show you some innovative ways to save money by conserving supplies.

Edited by Drake Lundell, this Supplement will cover all the things you feed your computer system, including tapes, disks, cards, paper and forms. Miniaturization of the supplies you use has the added benefit of saving storage space as well as using less material -- and this supplement will examine equipment that does this, such as computer output microfilm and photo reducing copiers

We'll also address the subject of security in this report. Diabolical threats like dust, excess humidity, fires, floods, theft or sabotage could bring your computer operations to a grinding halt. We'll review the risks -- especially in the area of physical security -- and report on ways you can reduce your exposure to them

Anyone who manages computer systems will find important and useful information in our September 27th supplement. And if you're a marketer of computer supplies or security products or services, you should advertise them here. Ad closing date is September 10th. Contact your *Computerworld* salesman for complete details. Or call Judy Milford at (617) 965-5800.

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University Finds 'Big Name' System Not Needed

By Esther Surden

Of the CW Staff

NEW HAVEN, Conn. – The University of New Haven and its students are doing very well, thank you, without a big IBM 370 or any other "name" system, according to Dr. Edward D. George, director of the computer center there.

"I don't like to put a name on the computer, because everyone then says, 'That's not an IBM shop.' We've tried to make it clear, and have been proving, that it doesn't *have* to be an IBM 370 or any other particular kind of computer as long as it functions to allow us to teach competitively."

And the minicomputer system at New Haven has done just that, George said, as witnessed by the jobs the university's graduates are getting.

Meta 4 System

The university has had a Meta 4 system from Digital Scientific Corp. for two years; it obtained the system as an upgrade to an IBM 1130 the university was previously using.

The system was chosen because the school wanted to easily upgrade without rewriting its Fortran programs. It also wanted a system that could support both batch and time-sharing.

Although the university looked into upgrading through IBM, an association was developed between the school and DNA Systems, Inc., a software house that specializes in upgrading IBM 1130 software. That association led the school to the Digital Scientific system, George said.

The Meta 4 has 64K bytes of memory; six on-line disk drives with 20M char./pack; a fixed-head swapping disk; two tape drives for backup; an IBM card punch; two card readers; two 600 line/min printers; four data sets; four CRTs; three hard-copy Digital Equipment Corp. Decwriter terminals; three Texas Instruments portable terminals; and a plotter. The configuration costs about $7,000/mo on a third-party lease, George said.

DNA, IBM Software

The university has purchased most of its software from DNA but has IBM's Cobol package as well. Hardware maintenance for the Digital Scientific system is coordinated by that firm, although the disk drives are from California Computer Products, Inc., which handles maintenance on them, he noted.

Thus far the system has been very reliable, George said.

Both academic and administrative work are performed on the system. "We deal with all of the financial work that is done by the business office, such as payroll and accounts receivable and payable," he said.

"We also do financial aid records for all students who are given aid through the financial aid office; we take care of admissions records of new students and we maintain a data bank of the presently registered students to allow us to run class rolls and accumulate statistical data on students," he added.

The system also performs scheduling and student billing and prepares alumni office letters and mailings as well as reports on attendance, he said.

The Meta 4 allows two simultaneous batch operations to be run and also has the capability of accommodating 16 terminals on-line, George noted.

About 650 students learn computer programming on the system each semester, George said. "Some of our students are going after a business degree, but most of them are in the business administration area or are studying criminal justice or engineering."

They take Fortran, Cobol and a subset of PL/I. The school can also teach APL, Basic or its own Assembler, he added.

The system is "up and running all the time," George noted, because even though the center closes down at 11 p.m., the students have access through remote terminals.

The mini has improved the ability of the university to make decisions. It has generated management reports that have been very helpful, George said.

Multiuser Software Runs on DEC Minis

MAYNARD, Mass. – Digital Equipment Corp. has introduced several hardware configurations which allow the PDP-15 and XVM systems to accommodate its Multiaccess software package.

Multiaccess is a multiuser version of Digital's XVM/RSX software system.

Up to six concurrent users can now be accommodated by the PDP-15 or XVM and as many as 16 terminals can be added to the systems depending on the amount of system memory and disk storage space available.

Existing RSX users can license Multiaccess for $2,750; Multiaccess for XVM systems costs $6,000.

Prices to expand PDP-9 and PDP-15 systems to XVM Multiaccess vary according to hardware configuration, DEC said from Maynard, Mass. 01754.

Turnkey System Cuts Manufacturer's Costs

(Continued from Page 33)

why I wanted to computerize, I probably would have said for order entry, to eliminate the huge duplication of paperwork we were doing," Chalfin continued. "But we're getting a great deal more than we ever thought we would.

"By computerizing, we have significantly affected the thinking of middle and top management. We find that we have taken a much more disciplined approach to the entire business operation.

"Today, we know a great deal more about the intricate workings of our own company and detailed data like the profitability of a single product," he remarked.

Acquisition Unit Links to Mini

WORCESTER, Mass. – Micro Networks Corp. has a miniature data acquisition system which it said can bus directly into a minicomputer line.

The buffering of selected outputs with tristate gates allows the data acquisition system to interface directly with microprocessors and minicomputers, the firm said.

The MN7002 16-channel, 12-bit system is expandable to 256 channels, a spokesman noted.

The unit costs $495; a military temperature range version costs $865, Micro Networks said from 324 Clark St., Worcester, Mass. 01606.

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Distributed Mini Net Boosts Energy Production

CALGARY, Alta. – By controlling the flow from more than 50 natural gas wells to two processing plants with a four-minicomputer distributed network, one of Canada's energy producers reported savings and increased production.

The system at Hudson's Bay Oil and Gas Co. Ltd. (HBOG) here manages, monitors and controls the flow rates from wells located 350 miles from the Calgary head office and central computer.

Currently, a second field system, which is over 850 miles from Calgary, is undergoing final testing prior to being incorporated into the computer network.

Studies are also in progress to add a third field to the expandable network.

Based on operation at one field over the past two years, the Hewlett-Packard Co. (HP) 9700 distributed system has accounted for a production increase of 1.5%, savings in overtime labor costs and increases in the proportion of valuable liquid natural gases produced, according to HBOG. Additional fuel gas savings of up to $20,000/mo have been accrued from temperature control of the fluid streams produced by the wells.

"The distributed network system provides us with a flexible and expandable system at a moderate price," Art Wichert, superintendent of automated systems for HBOG, explained.

"Eventually, we may have a number of process control computers in field areas serviced and backed up by one central communications computer."

The distributed system consists of a supervisory central communications computer (CCC) located at the company's headquarters here. The CCC employs an HP Real Time Executive RTE-II operating system. The CCC collects field production data for management review, acts as a communications central for messages and interrogates field systems upon demand by users.

It also is used for software development and is available to back up the field process control computer (PCC) satellites.

The PCC systems are located in the field areas and operate under HP RTE-II operating systems also. Communications between the CCC and the PCC computers take place over telephone lines. The PCC contains all the application programs which are responsible for printing alarms, reports and issuing control setpoints or choke valve opening positions of the well.

The PCC systems have, as slaves, HP processors called Computer Satellite Units (CSUs). They are at the lowest level of the distributed systems hierarchy and are used for data samples and reduction as well as for maintaining the setpoints called for by the PCC.

HBOG has one field operating system located at the company's Kaybob South gas field about 350 miles north from Calgary in Central Alberta, while the other system is located at Zama, an oil and gas field 850 miles away in Northwestern Alberta.

The PCC systems, both Hewlett-Packard 9640 data acquisition and processing systems, monitor plant and field operating conditions and check for abnormalities. They also calculate flow rates for individual wells to meet operating plant requirements. These flow rates are then communicated, in the case of Zama, to the HP CSU which assures that settings on each well's choke valve are maintained.

At Kaybob, this same valving control function is performed by 11 "smart" remote terminal units (RTUs) directly connected to the PCC. The RTUs are 4K computers responsible for data collection, choke control and conversion of sensed signals to engineering units.

Arranged in this way, the distributed system for controlling and monitoring the gas and oil fields and processing plants serves all levels, from management to field operation and maintenance. System backup in the case of failure is accomplished by transferring control to the next level of computers.

Each computer is capable of operating independently and sharing the load as needed. Peripherals can be shared and the system offers backup redundancy, he added.

Prior to the installation of the supervisory control system, flow rates on individual wells had to be adjusted manually by operating crews each time the plant required a flow change. The crews would travel through the gas field and adjust flows on a sufficient number of wells to meet the requested change.

In addition to flow adjustments, the operating crews had to visit well sites on a daily basis to check for equipment malfunctions and obtain data for operating reports.

Operating conditions monitored by temperature and pressure sensors now are transmitted to the remote terminal unit (RTU) at the well site, through a multiplexing device, an analog-to-digital converter and (at Zama) the HP 2100 CSU slave computer before finally arriving at the HP 9640 PCC system.

Scans of the sensors are made every three minutes, or more often if necessary. At these intervals, the flow rates are calculated. A flow rate program calculates the current cumulative flow rates of all wells and compares this figure with the desired plant inlet rate which has been entered by the system operators.

If the desired rates and current rates are different, the flow program calculates new flow setpoints for each of the wells and sends these new well setpoints to the CSU which controls the field chokes.

The Zama system will utilize a 32K HP 2100 slave processor called the Computer Satellite Unit to handle data manipulation between the PCC and the field RTUs. Production control panels and two teleprinters will allow operators to access data and reports while allowing total field rates to be controlled as desired.

The Zama or Kaybob PCC can be backed up in Calgary by using the last data base transmitted (less than 24 hours before) and activating either Zama or Kaybob operating programs.

In the field, the PCC could be by-passed or, if the CSU failed, the PCC could be converted to a CSU. Operating control would, therefore, be transferred to Calgary but reports could continue to be sent to the user's terminals in the field upon request.

Management Statistics Provided

One of the roles of the central HP 9640 CCC system is to gather production and accounting reports from the PCC field systems for supervisors, analysts, technical staff as well as maintenance and operating personnel in the company.

Daily and monthly production volume statistics are forwarded to the central Calgary computer. These statistics are also available from any of the terminals on the system. Other reports, tailored to any particular user, are provided, such as well summaries, average operating conditions, plant operating reports and supervisor's reports.

Communications between these field computer systems and the central system here takes places over dedicated leased telephone lines.

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CI Notes

IBM Documents Not Admitted In West Coast Lawsuits

LOS ANGELES – Although a passel of documents have been turned over to the court in the U.S. vs. IBM antitrust case by order of Judge David N. Edelstein, these same documents are still considered privileged in the upcoming trials being pressed by West Coast firms against IBM.

Judge Ray McNichols told a pretrial hearing here he does not agree with the standards used by Edelstein and therefore did not order these documents to be submitted, sources said.

In another move, California Computer Products, Inc. (Calcomp) is dropping claims of damages by IBM to the tape drive sector of its business.

Calcomp will be the first of the several plaintiffs to try its case against IBM in a jury trial scheduled to start Nov. 8

Calcomp attorney Max Blecher indicated the move was an "accommodation to the shortness of life," adding it "seemed prudent to narrow the case down."

Observers expect the Calcomp trial to have a duration of four to six months.

Police Find Xerox Parts at Valcomp

LOS ANGELES – Printed circuit boards worth $8.7 million that were discovered missing from Xerox Corp. here in March turned up at Valcomp Co. during a search in early July by police.

Valcomp, a subsidiary of Tymshare, sells add-on peripherals and spare parts to Xerox users, among others.

No arrests have been made. Valcomp, Tymshare and Xerox spokesman had no comment on the situation.

Iomec Moving to Minnesota

MINNEAPOLIS – In yet another centralization move, Data 100 Corp. plans to pull its Iomec operations closer to home to a plant in Minnetonka, Minn., and close its current facility in Santa Clara, Calif., by Jan. 1.

The decision to move Iomec was based on revised marketing forecasts and potential cost savings in the smaller Minnesota facility, according to Thomas G. Herschbach, group vice-president.

The transfer affects 180 employees at the Santa Clara plant, a number of whom have been offered jobs elsewhere in the company, a spokesman said.

The firm transferred its minicomputer manufacturing from Santa Ana to Minnetonka last January.

In May, Data 100 sold Iomec's paper tape and magnetic tape cartridge product lines, leaving Iomec with disk production.

Amdahl, IBM Cross-License Patents

By a CW Staff Writer

SUNNYVALE, Calif. – Industry observers have been wondering what IBM's reaction would be to the upstart challenger Amdahl Corp., which has been making some inroads in IBM's 370/168 territory.

The most notable – although hardly noticeable – action so far has been a recently negotiated broad cross-license agreement on patents between the two firms.

The agreement, which came to light in a prospectus Amdahl filed with the Securities and Exchange Commission, is included in a list of licensing agreements with other companies, principally Fujitsu.

"IBM and Amdahl have entered into a nonexclusive worldwide patent cross-license agreement for the field of information-handling systems," an IBM spokesman said.

"The agreement requires no royalty payments from IBM and establishes an initial front-end royalty credit for Amdahl. After the credit is exhausted, Amdahl will pay royalties to IBM if its usage of IBM patents exceeds IBM's usage of Amdahl patents," IBM said.

"The fact is that in order to legally sell [the Amdahl 470V/6], Amdahl must have a license from IBM. So [it] came to us and we negotiated on the basis of present value. The terms of the agreement reflect that," an IBM spokesman added.

There is compensation for Amdahl in the sense that it gets credits from Amdahl patents which IBM uses, and Amdahl therefore only pays to the extent that its use of patents exceeds IBM's, he explained

While noting the terms of the agreement might be beneficial to IBM in the future if it decides to use Amdahl technology, "the fact is that [Amdahl is] a new company, it's just starting out and needs our licenses, so it came and got them. And that's something that's negotiated on the basis of present value. That's a fairly typical arrangement," the IBM spokesman said.

Under the IBM-Amdahl agreement, signed in May and retroactively effective to June 1, 1975 each granted the other license as to its patents issued and to be issued pursuant to applications filed prior to July 1, 1980.

The agreement covers substantially all patents relating to computer systems held by each party, except for cosmetic design patents.

"The agreement covers both hardware and software to the extent the latter may be patentable and covered by the patents" for the lives of the patents, the Amdahl prospectus said.

"The agreement provides for royalty payments to IBM based on various formu-

(Continued on Page 40)

Study Finds Strong Interest In EFT by Financial Houses

By a CW Staff Writer

ATLANTA – Eighty-six percent of large banks' marketing executives expect their institutions will offer debit cards by 1980, according to a survey of financial service institutions (FSIs) conducted by the Payment Systems Research Program (PSRP), a subscription research program of Payment Systems, Inc.

Other optimistic opinions about the future of electronic funds transfer (EFT) systems were uncovered by the study which surveyed the 500 largest commercial banks, 200 largest savings and loan associations, 100 largest mutual savings banks and 175 large credit unions.

Approximately 75% of all FSIs with over $1.5 billion in deposits and 60% of those with over $500 million in deposits responded.

The survey found a favorable climate among FSI marketing executives for the introduction of EFT systems, with most stating they plan to participate in some sort of EFT program within the next several years.

FSIs' interest "stems primarily from a desire to maintain or improve their competitive position in the marketplace," the report stated.

"While they are aware of consumer concerns and not particularly satisfied with their present advertising efforts, they are spending a relatively limited amount of money on research into consumer marketing of EFT," PSRP said.

ATM Rise Forecast

Ninety-three percent of bank marketers surveyed predicted their institutions would have automated teller machines (ATMs) by 1980.

Although only 20% of the savings and loans and mutual savings banks surveyed have ATMs now, 86% forecast adding them by 1980.

Only about 5% of FSI marketers believed their institutions would not participate in merchant point-of-sale terminals within the next five years, while about 60% believed consumers will view the convenience of EFT terminals at retail store locations as a major benefit, the PSRP survey found.

A majority of respondents – 55% of banks and 51% of thrifts – agreed EFT systems will improve the profitability of consumer financial services, PSRP said.

Finally, only 23% of the marketers at high branching banks (those with more than 10 branches) and almost 46% of marketers at high branching thrifts expect to add more than 10 branches by 1980, the survey found.

Market Share Changes Forecast For Data Acquisition Subsystems

WELLESLEY HILLS, Mass. – Although systems houses specializing in data acquisition subsystems can expect increased revenues between now and 1980, they will lose market share, according to a report from Venture Development Corp. (VDC), a market research firm here.

OEMs and end users capable of developing their own subsystems are bypassing the systems houses, and this trend could prove disastrous to systems houses unable to adapt to a more sophisticated marketplace, VDC said.

In 1975 systems houses accounted for 62% of the total $81.9 million world market for data acquisition subsystems, according to VDC.

By 1980, both sales and units to systems houses will fall below the 45% level.

While OEMs accounted for 25.3% of the market in 1975 and end users for 12.7%, their shares will grow to 35.5% and 20.5% respectively by 1980, VDC said.

Despite the decline in market share, VDC predicted continued growth for systems houses, although at a slower rate than that of the total subsystems industry.

While shipments to systems houses will increase in value at a compounded rate of 8% between 1975 and 1980, the total world market for subsystems will increase at a compounded rate of 15.7%, VDC noted.

In terms of units, the firm predicted shipments to systems houses will increase at a 14.3% rate, while overall shipments will grow at a 22.5% rate.

"Chief among the factors contributing to this differential is the increased sophistication of components," VDC stated. "Subsystems that once consisted of racks of discrete components now are available in hybrid IC packages.

"As a result, OEMs and end users now find they can fill many of their simpler data acquisitions requirements with inex-

(Continued on Page 40)

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Varian Targets Commercial Area Needing Distributed Processing

By Esther Surden
Of the CW Staff

IRVINE, Calif. – Varian Data Machines, known for its scientifically oriented minicomputers, is diving head first into the commercial distributed processing marketplace with emphasis on real-time transaction processing, according to its president, Dr. Donal B. Duncan.

The firm is reaching out to customers in commercial areas. "The most active interest is in banks," he said in a recent interview here.

Most of Varian's business presently is in the real-time scientific areas with system houses and end users taking significantly smaller portions of the firm's business dollar, Duncan said. Continued emphasis will be placed on the scientific marketplace, he noted.

The firm's thrust is to sell its V70 series system to the sophisticated user. "We sell a good computer and a good system. We don't say 'Here's a turnkey solution'; we sell [users] the tools they need, definitely not just the hardware but the system software as well," Duncan said.

"We have picked out the area of providing hot hardware and hot software, and as given it is a narrowly defined area," he continued.

The market for that kind of business is $175 million, he projected. Varian is a $50 million dollar company in terms of sales volume, he said.

"The trend is toward the commercial use of minis. The major factor minis have now is software capabilities in data base management," he said.

With the data base management now available on Varian systems, the firm has the ability to go toward distributed processing systems, Duncan said.

"Distributed processing systems are now about to honestly occur," he said, adding the first people to implement them will be "very large and sophisticated users.

"The thing that is unique is that data base is getting into the minis," he added.

Of course, this means a thrust toward communications development, he said.

The first major test of the Varian distributed processing capabilities will come when Varian creates a network in its offices in Europe.

Amdahl, IBM Have Licenses

(Continued from Page 39)

las which, for machines sold, will not exceed .4% of the selling price. No royalty payments are made by IBM, but Amdahl's payments may be reduced to the extent of IBM's usage of Amdahl's patents.

"No royalties are payable by Amdahl until the total sales value of appartus utilizing IBM's patents delivered by Amdahl reaches $190 million," the prospectus stated.

Amdahl has filed 30 patent applications in the U.S. and more are being prepared. In addition, Amdahl and Fujitsu have each licensed the other under certain of their respective patents and technical information.

"The Amdahl-Fujitsu licenses are subject to any preexisting licenses from either party to any third party and are also subject to the right of either party to enter into a cross-license with a third party to avoid infringement of the patents of any such third party," the prospectus noted.

Fortune Lists Philips at Fifth Of Largest Companies Outside U.S.

CHICAGO – Germany's Philips Gloeilampenfabrieken ranked fifth in *Fortune Magazine*'s listing of the 500 largest industrial corporations outside the U.S.

Three of IBM's foreign-based operations made the list, with IBM Deutschland garnering 99th place.

In a separate list, *Fortune* ranked IBM as 11th in terms of the 50 largest industrial companies in the world.

On the list of 500, Germany's Siemens came in 14th, down one place from last year, with sales of $7.7 billion. Philips' sales figure for the year was $10.7 billion.

AEG-Telefunken of Germany was 29, while Matsushita Electric Industrial of Japan was 32.

France's Thomson-Brandt rose 15 places since last year to 68.

Following IBM Germany's lead, IBM France rose 28 places to 124 with sales of $1.7 billion, compared with the German firm's $2 billion.

Nippon Electric was listed as 131, Schlumberger of the Dutch Antilles was 137, Britain's Rank Xerox was 152 and Italy's Olivetti was 163.

Fujitsu retained its last year's rank of 229, while IBM UK squeaked ahead five places to 237.

Honeywell Bull, which did not make the 1974 list, was ranked 318. Britain's International Computers Ltd. also made the list this year as 364.

Subsystem Shares to Change

(Continued from Page 39)

pensive, off-the-shelf, modular/PC board and IC data conversion circuits," VDC continued.

The availability of low-cost intelligence must also be considered an important factor in the future, VDC stated, noting however, that in the long run this development should be beneficial to systems houses.

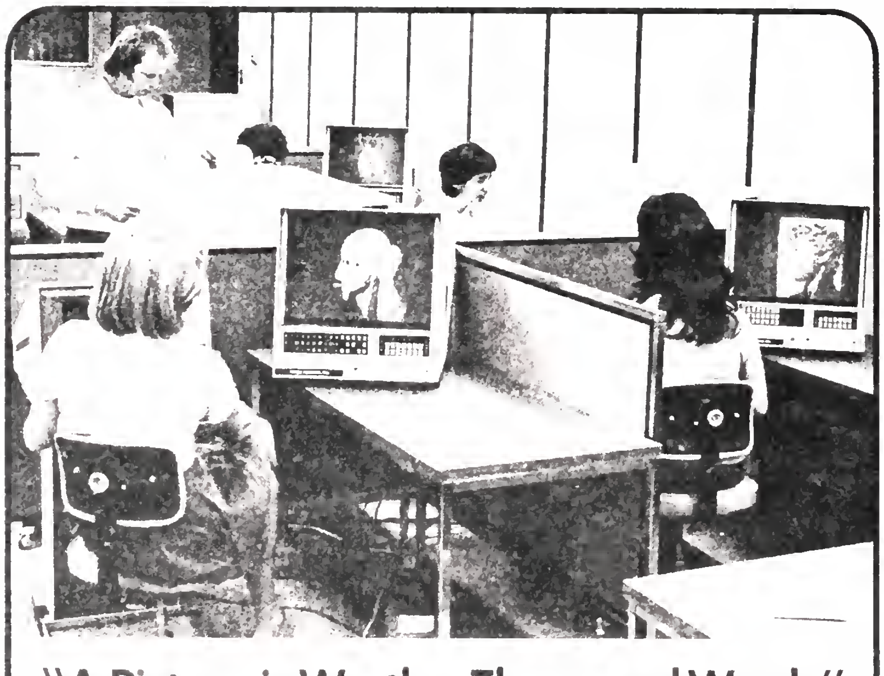
Of eight types of subsystems explored, VDC predicted the market for intelligent data acquisition subsystems will expand the fastest in both revenues and units between now and 1980, with shipments rising at a rate of 28.5% yearly and annual sales reaching $24.3 million.

Closely related to the class of intelligent subsystems are communications-oriented subsystems, currently the largest subsystems segment (22.9%) in terms of revenues and expected to retain this dominance through 1980.

VDC predicted that by 1980 it will be impossible to distinguish between intelligent and communications-oriented subsystems since the "intelligent subsystem will have communications capability and the communications-oriented subsystem will be 'smart.' "

Other classes of data acquisition subsystems expected by VDC to show significant revenue increases are modular subsystems, data loggers and subsystems for temperature sensing.

Sales of "standard" subsystems, subsystems for data display, and scanners/multiplexers are expected to remain relatively flat throughout 1975-1980.



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Makes Fourth Upgrade

DP Center Growing at Saudi University

By Peter Fingar
Special to Computerworld

DHAHRAN, Saudi Arabia – Both a new computer and a new director were installed recently on the sands of Arabia.

The new computer is a 3M-byte IBM 370/158 that replaced a 370/145. The new director of the Data Processing Center (DPC) is Ahmed Al-Sari.

The DPC, located at the University of Petroleum and Minerals, is one of the major computer facilities in the Middle East.

The hardware change represents the fourth major upgrade since the first computer was installed in 1967, an 8K IBM 1130. The 1130 was used for basic administrative applications with no initial faculty or student use.

Because of the importance of the DPC to the whole of Saudi Arabia as well as the university, a "service bureau/university computer center" venture was embarked upon and an IBM 360/50 was installed in 1969 as an addition to the 1130.

The venture was successful and computing demand grew from within the university and external users. In order to keep pace with the demand, an IBM 370/145 displaced both the 1130 and 360/50 in 1972.

International News

With the installation of the 370/158, the present configuration includes an IBM 2501/1403 batch station and 28 IBM 029 keypunches in the main student input/output area.

Administrative data processing and the systems engineering departments are serviced with two IBM 3780 remote batch stations, 10 IBM 2741 interactive terminals, an IBM 3881 optical mark reader unit and five IBM 3742 key-to-diskette units.

Student works with 3742.

Saudi student is engrossed in maneuvers on CRT.

This system is operating under OS/VS1 with Tone support for the 2741 terminals. Student jobs are run using Watfiv and Watbol batch compilers.

In addition, several scientific computing packages are used extensively. These include CSMP, HIDES, Ices, Dynamo, SSP, Omnitab, Chess, SPSS and Ecap.

The growth in hardware has been matched with a growth in applications. The administrative data processing provides a large number of services to the university administration.

The College of Engineering, for instance, makes extensive use of the DPC in support of its systems engineering and general engineering curriculums. The College of Industrial Management introduced a new bachelor degree program in information systems and an Educational Services Group within the DPC serves the DP training needs of the kingdom.

External users from government and private sectors account for about 50% of present system utilization.

Funded by the government of Saudi Arabia, the university received about $95 million for its operating and capital expenditures budget.

The university offers basic science and engineering courses leading to bachelors and masters degrees. There were 1,600 students enrolled in June.

Students' expenses are fully covered and they are paid monthly stipends.

Fingar, an educational specialist at the University of Petroleum and Minerals, teaches a DP training course and serves as a systems analyst.

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Going out of our way to be convenient to the vast majority of America's computer buyers has been our way since 1972. But the 1977 Caravan, our sixth national tour, will be more convenient than ever before. It will be visiting the largest computer markets in the U.S. with a three-day exhibition, buyers' forums and exhibitor seminars. For a majority of America's computer buyers, the Caravan will be as close as a daily commute. And approximately 75% of the people who buy computer products and services in the U.S. will be closer than 150 miles to one of the Caravan exhibition sites. This special convenience will make it easy for tens of thousands of important buyers and buying influences among users, OEM's and Systems Houses to meet a cross-section of the industry's most progressive companies. As an exhibitor, the Caravan can give you a highly efficient opportunity to qualify prospects, demonstrate your products and reinforce your corporate image, among other major marketing benefits.

Here's where we'll be going in 1977:

City	Dates
San Francisco	March 29-April 1
Los Angeles	April 5-7
Cleveland	April 19-21
Minneapolis/St. Paul	April 26-27
Chicago	May 3-5
New York	May 10-12
Philadelphia	May 24-26
Washington, D.C.	May 31-June 2
Boston	June 7-9

Exhibitor Participation Plans

There are several ways for you to participate in the 1977 Caravan, and you can choose the one most suited to your company's marketing needs. Most Caravan exhibitors get complete, national coverage with our full-tour, standard booth and complete package of support services. OEM exhibitors — or those who wish to cover major cities only — can exhibit in our Major City/OEM tours with a standard booth and complete support package. The five cities in the Major City/OEM tours are San Francisco, Los Angeles, Chicago, New York and Boston.

If you don't need a full booth to tell your story, then the minibooth is available at a mini price. The minibooth comes ready for participation in the Full Tour and the Major City/OEM Tour with a complete package of Caravan services. The minibooth offers you a unique advantage: it does not have to be manned in every city. So you get personal contact selling where you need it, and a travelling billboard where you don't. In the un-manned cities, the Caravan staff will stock your exhibit with your literature and sales aids, then collect inquiry cards from interested attendees and forward them on to you. Attendee-activated or continuous loop slide or film programs can be used to highlight your sales message in a graphic and memorable way. In those cities where you have field sales staff, they can man the exhibit and get the full benefit of face-to-face Caravan contact.

The Caravan Support Team

We've formed a special Caravan support team to make it easier than ever for you to be part of Caravan 77. They will help you clarify your objectives and expedite the details involved with your participation. They can give you expert advice on everything from designing your graphics to integrating the Caravan as a high performance tool in your overall marketing plans. An Account Executive from the Caravan support team will be available to work with your sales and management staff as soon as you've returned our Caravan Exhibit Space Reservation Agreement. So it'll pay you to sign up soon. Make the Caravan 77 a powerful accelerator of your market penetration next year.

For complete details on Computer Caravan 77 and an Exhibit Space Reservation form, send in the coupon below. Or call our National Sales Manager, Roy Einreinhofer, at (617) 965-5800.

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Maker of Programmerless System Eyes Rapid Growth

By Esther Surden
Of the CW Staff

BURLINGAME, Calif. – What hath John Peers wrought?

He calls it Adam, a small business system designed for unsophisticated small business users. He also calls it a "lomac," or logical machine.

And the name of his company? Logical Machine Corp., of course.

Peers' goal is to "put machines back in the hands of the people," he said in a recent interview here, because in the next several years "we may end up with a computer that costs $300/year. How can we justify a programmer at $40/hour when you're paying $10/month for the system?"

The firm, incorporated in 1974, shipped 71 Adam systems as of Aug. 12, Peers said. Seventeen dealers, both foreign and domestic, sell the systems.

Peers predicted rapid growth for Logical. "We will ship 250 systems in the next year and 600 more in the following year," he said, "because the user doesn't have to hire two programmers for every machine we sell."

Peers also expects a price erosion in Adam's price. "In two years' time, the system may cost $20,000, not $40,000," he said.

Why Programmerless?

Why a programmerless system? What are the qualities of a programmer's job? Peers replied. A programmer must be logical, capable of never being bored, deal with repetition and like detail while at the same time maintaining accuracy, he said.

"The reason we have so many problems with software is that no one has thought that it could be generated by a computer," Peers explained.

Adam "learns" the meaning of new words in terms of previously learned words and is "taught" the difference between verbs, nouns and structures via the keyboard, Peers said.

Another advantage of Adam, Peers said, is its flexibility. The user can change his mind in the middle of programming an application if what he is getting is not what he wants.

Normal systems take a long time to be revised, he said; with Adam, the user isn't locked into one particular way of doing things.

"After all," Peers said, "the solution to a problem changes the problem."

Adam is aimed at small businesses with anywhere from $500,000 to $50 million in sales, he said. Logical has a policy not to sell to any firm with a higher volume than that because it would not be happy.

Adam has a 40% referral rate, Peers said.

New Systems

Joining Adam's family by the end of the year will be Adam Junior and Adam Senior, Peers said. Adam Junior will contain a minicomputer, floppy disk, 30 char./sec printer, keyboard and CRT for less than $20,000.

Adam Senior will have a range of disks from 24M to 100M bytes, a keyboard, screen, twin floppy disks, Adam logic and a 300 line/min printer, Peers said.

The system will also have the ability to communicate to other Adam systems but not until six months after its introduction, Peers said. Thus multiple Adams will be available for distributed processing applications, he said.

Facsimile, word processing and other unique applications will all merge on one system in the future, Peers predicted, and the time is not far away when a machine will be produced that the user can talk into and modify.

A Reality Tomorrow

The industry predicts on a straight-line basis, but invention isn't on a straight-line basis, he added. What sounds like science fiction today may be a reality in the future, he said.

With the IBM 3s, 32s and 5100s, IBM has "endorsed the fact that at that point in a business you can have a legitimate computer," and it has in effect boosted the market for small systems, Peers said.

John Peers

"The major problem with dealing with us is our stability," Peers said frankly. "You've got to try" to make people believe that you are here to stay, he said.

OEM Conference Set To Start Tour Sept. 8

NEWPORT BEACH, Calif. – The Invitational Computer Conference (ICC) will open its nine-city 1976-77 tour in Newton, Mass. on Sept. 8.

The one-day conference is aimed at OEMs and will feature product introductions and displays by 30 manufacturers as well as eight product seminars of interest to OEMs, sophisticated end users and system house attendees.

Other cities on the schedule are Chicago; Minneapolis; Dallas; Orange County, Calif.; Ft. Lauderdale, Fla.; Palo Alto, Calif.; Hempstead, N.Y.; and Philadelphia.

Further information is available from the ICC sponsor, B.J. Johnson & Associates, at Suite 204, 2503 East Bluff Drive, Newport Beach, Calif. 92660.

Medical Mart to Grow 19%

WETHERSFIELD, Conn. – The medical computer market is experiencing a steady compound annual growth rate of 19% which will result in growth from $170 million in 1974 to $450 million by 1980, according to a report by Theta Technology Corp.

Accounting applications presently make up 65% of these DP systems, the report noted, but within a few years the main growth will be in turnkey services and mini-based computers.

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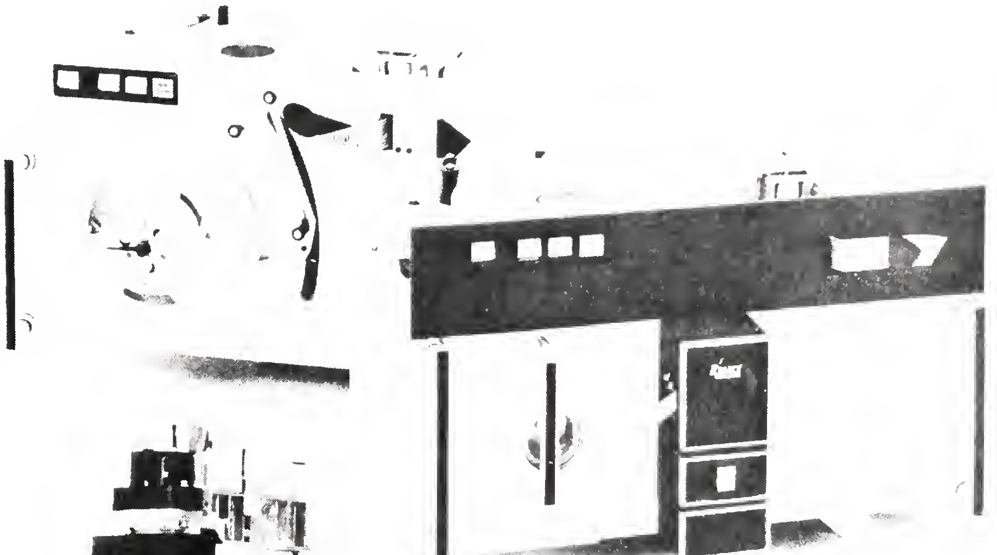

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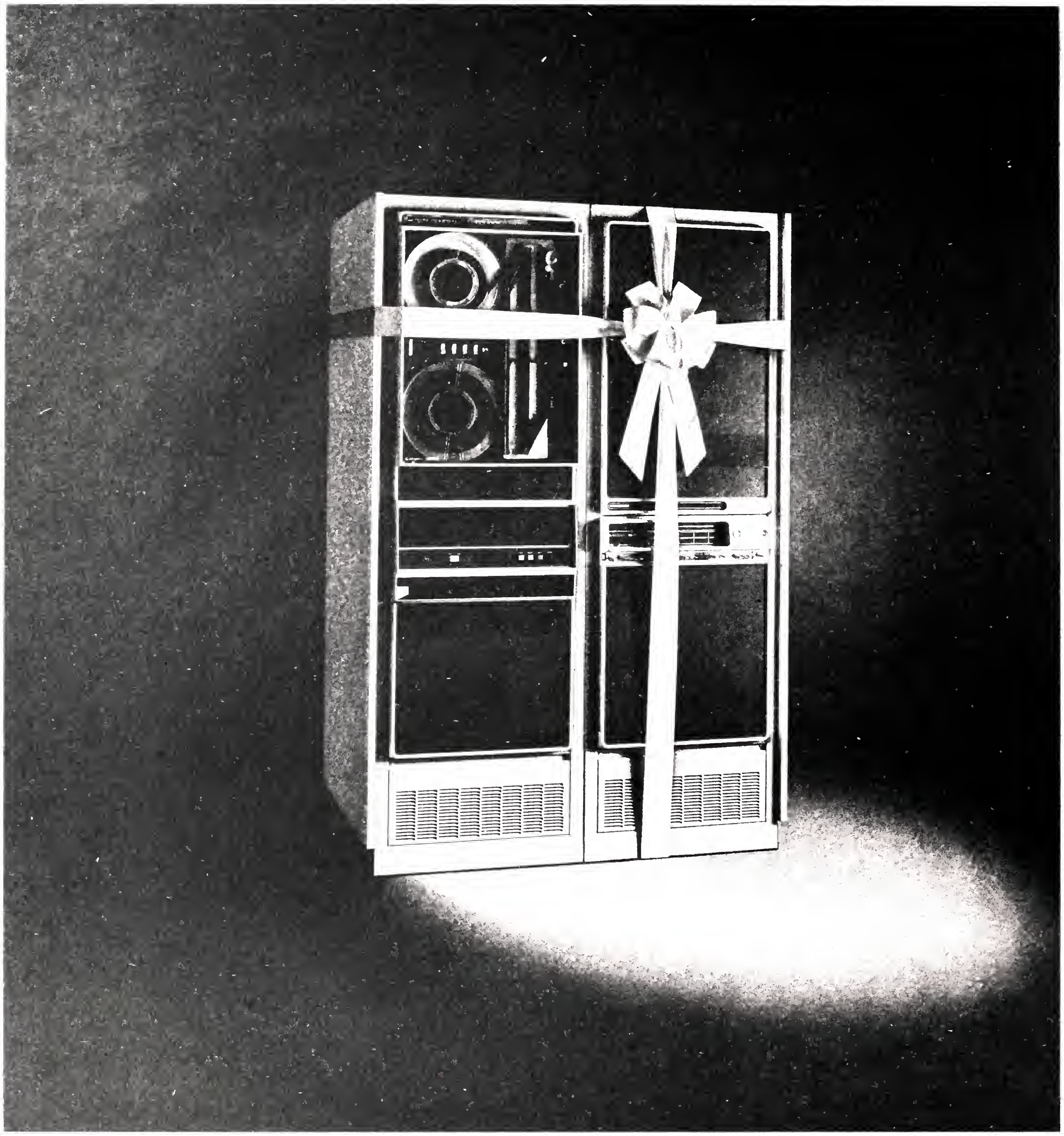

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National Tea Selects National Semi POS

SANTA CLARA, Calif. – National Tea Co. has ordered $6 million worth of Datachecker electronic point-of-sale (POS) systems from National Semiconductor Corp.

The agreement, which runs through September 1978, allows for installation of POS equipment in more than 100 National Tea stores. National Tea already has Datachecker equipment in more than 60 stores.

The equipment includes T-2500 stand-alone terminals with polling subsystems, scanning equipment and key-entry alpha systems without scanners, according to National Semiconductor.

Other O&I

U.S. Precision Lens is the first U.S. firm to install an IBM 5230 data collection system, according to IBM. The system will be used by on-the-job manufacturing workers to enter information from magnetically-coded badges into data-entry stations located in their work area.

Orders & Installations

The Associated Press has ordered Delta 4000 video display terminals from Delta Data Systems as part of a minicomputer-based disk operating system AP is installing.

Product Research Co. has ordered a Univac 90/30 system to replace an NCR 200. The 90/30 will be used initially for order entry but will be implemented to control manufacturing operations.

Midwest Financial Management Corp. has installed a Burroughs B1700.

System Development Corp. has ordered 16 "Super Disks," large-capacity disk storage units, from Storage Technology Corp.

Columbia Newspapers, Inc. has ordered a 56-VDT composition/business system, including a Dymo/Xylogics copy processing system CPU 740 and a Data Processing Systems BPS 800 from Dymo Graphics Systems, Inc.

Erco, Inc. has ordered a second NCR Century 251 computer to support on-line processing services it offers to credit unions.

The Federal Trade Commission has ordered 22 Visual Type word processing systems from Daconics, a Xerox Corp. subsidiary, to form a regional communications network.

Durr-Fillauer Medical Inc. has ordered 10 NCR Century 8200 minicomputers, each with four visual display terminals. The firm also ordered two Century 101 computers, each with a minimum of 12 visual display terminals, for a computer network it is designing.

Pink Supply Corp. of Edina, Minn., has installed a Burroughs B700 system for performing budgetary operations.

TRW Earnings Up 31% in Quarter

CLEVELAND – TRW, Inc. reported sales for the second quarter were up 11% and earnings increased 31% over 1975 second period results.

For the second quarter, sales reached $743.8 million compared with $667.1 million for the year-ago period.

Earnings reached $37.8 million or $1.18 a share compared with a restated $28.9 million, or 88 cents a share a year ago.

Results for the first half showed sales reached $1.4 billion compared with $1.2 billion for the year ago period.

Perot Made Large Political Gifts

DALLAS – H. Ross Perot, chairman of Electronic Data Systems Corp., was the largest individual contributor to congressional elections two years ago, according to Common Cause, a citizens' lobbying group.

Perot contributed a total of $90,900. Of this figure, $63,000 went to democrats, $27,900 to republicans.

In a further breakdown, Perot contributed $28,500 to members of the House Ways and Means Committee and $26,000 to members of the Senate Finance Committee.

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Sales index of budget-cutters and non-cutters

	1968	1969	1970	1971	1972	1973
Maintained budgets in 1970 & 1971	100	118	123	135	156	200
Cut budgets in both 1970 and 1971	100	111	109	111	122	145

2. Your brand stands out.

A McGraw-Hill survey of their business magazine readership indicates that a company's advertising can affect a company's reputation. Some of the reader comments:

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"I feel that a strong ad indicates strong management."

"I buy from someone who advertises ...it spells quality to me."

3. Your salesmen stand out.

An article published in the Harvard Business Review ("Industrial Advertising pays off," Harvard Business Review – March-April, 1970) shows that sales costs are reduced when a strong advertising program supports a sales program. The total cost of selling to groups exposed to advertising often *drops* by 10% to 30%.

On the other hand, the non-advertiser stands at a serious disadvantage in a well-advertised market. His cost of selling to groups exposed to his competitors' advertising may actually increase 20% to 40%. This isn't a happy thought in times when you're selling less.

*For a copy of this study entitled "How Advertising in Recession Periods Affects Sales," send $1.00 to American Business Press, 205 East 42 St., New York, 10017.

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POSITION ANNOUNCEMENTS

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A consulting and computer services company specializing in the design and implementation of Material Requirements Planning systems is seeking individuals with programming and systems background in manufacturing applications. An understanding of B/M Processor and M.R.P. is required. Production and Inventory Control user experience will be a plus. A challenging opportunity with a professional team. Excellent salary/company benefits. Please send resume, including references to:

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For further information on these and other positions, send resume in strict confidence to

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Product Coordination

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Responsibilities also include development of product release documentation, assistance in key customer pre-sales support, development of special industry sales plans, functioning as control point for product enhancement and new product requests. Participation in convention and sales meetings required. Limited travel.

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Individual needed to work in systems design and programming applications to maintain a Manufacturing Data Base under DBOMP through CICS. Must be a self-starter with degree and two years experience with CICS coupled with knowledge of COBOL and DBOMP.

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Individuals will have 2-5 years COBOL programming experience coupled with a sound working knowledge of systems design. Must be self-starter and capable of working with a project team in all phases of systems development from problem solving and programming through implementation in a manufacturing environment. Experience in bill of material processing, material control systems or financial applications necessary. Knowledge of BAL and Mark IV a definite plus.

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Individual will possess a degree in computer science and have the ability to communicate and educate users on Data Processing related subjects as well as writing and maintaining data processing standards.

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Position offers competitive salary commensurate with experience and skills, and the chance to associate with a fast moving, rapidly expanding electronics company. Those qualified to make a major contribution in this key executive position should send their resume, with complete salary history, in confidence to: **Manager of Employee Relations, Datapoint Corporation, 9725 Datapoint Drive, San Antonio, Texas 78284.**

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This position is within the campus Computing Services Office. The office is responsible for all academic computing services and operates a CDC CYBER 175, an IBM 360/75 and a DECSystem-10.

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East: Boston (617/237-3120), New York-New Jersey (201/687-8700), Philadelphia (215/665-1717), Washington, D.C. (703/790-5610).

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South & Southwest: Atlanta (404/634-5127), Dallas (214/638-4080), Fort Worth (817/338-9300), Houston (713/626-8705), New Orleans (504/523-2576).

West Coast: Los Angeles (213/386-5500), Irvine, CA. (714/833-1730), Palo Alto (415/328-7155), San Francisco (415/434-2410).

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Datapoint Corporation, a fast growing computer manufacturer, is seeking a qualified manager of sales training for its expanding national marketing group. This position requires an outstanding individual. Qualified applicants will have a relevant college degree, or the equivalent, plus 3 to 5 years industry experience.

Necessary skills include the ability to convert technical terminology to sales terms. Responsibilities will include development of programs for training of newly hired sales personnel and refresher courses for existing staff, plus the conduct of sales training courses for all levels of company personnel. Successful candidate will have excellent verbal and written communications ability, with a good grasp of business computer hardware and software concepts.

Position will be at Datapoint's corporate headquarters in San Antonio. If you have the qualifications to make a meaningful contribution to the continued growth of a fast moving computer maker in this key executive position, send your resume with complete salary history, in confidence to: **Manager of Employee Relations, Datapoint Corporation, 9725 Datapoint Drive, San Antonio, Texas 78284.**

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Old Dominion University invites applications for a Computer Analyst/Programmer on a three year NSF-funded project for the improvement of science education with possible continuation beyond the duration of the grant with the University Computer Center. Candidates should have a B.S. in Computer or Physical Sciences, at least two years of experience in the creation and maintenance of computer assisted and computer managed instructional software as well as experience with the DEC system-10 or other major time-sharing systems and University computer facilities. Salary range is $13,500 to $15,000 depending on experience. Candidates should forward resume and two letters of reference to Dr. Dennis A. Darby, ODU-CAUSE Coordinator, Dept. of Geophysical Sciences, Old Dominion University, Norfolk, Va. 23508. *Old Dominion University is an equal opportunity affirmative action employer.*

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SENIOR PROGRAMMER ANALYST

The successful candidate should have 5-7 years of general business knowledge with experience in COBOL, OS JCL, and IMS, as well as good communication skills. Knowledge of on-line order entry/inventory control would be a plus. Degree preferred.

These are career opportunities in an established growth-oriented company. We offer an excellent salary and benefits program, as well as paid relocation.

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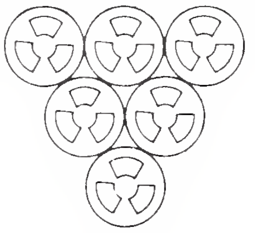

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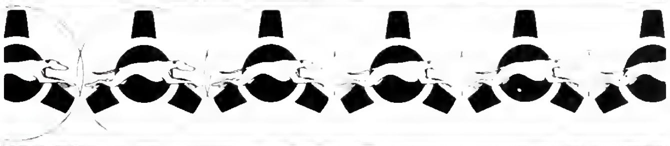

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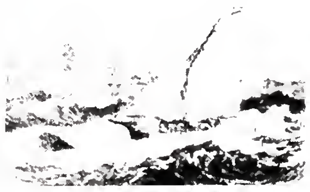

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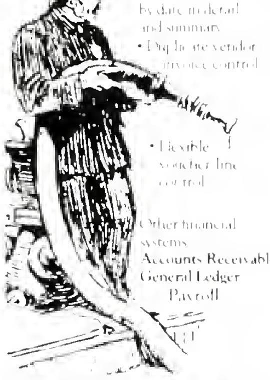

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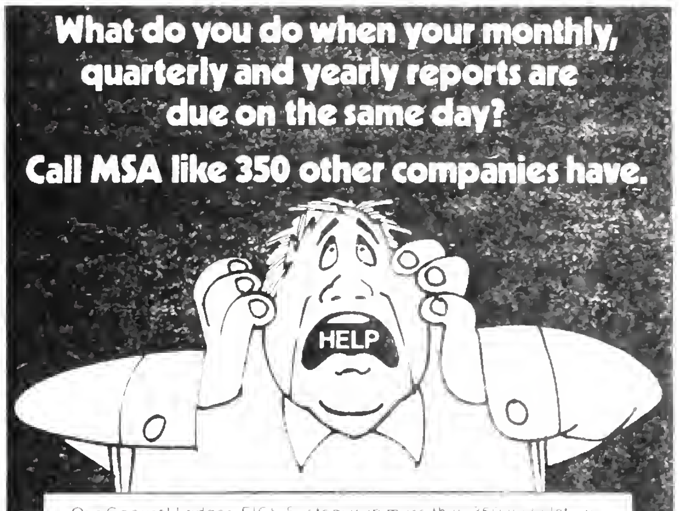
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HP Net Dips in Quarter, Nine Months

PALO ALTO, Calif. Hewlett-Packard Co. (HP) reported a 13% rise in revenues but a 9% drop in earnings for the third quarter ended July 31 compared with year-ago figures.

During the quarter, the pocket calculator business operated at a loss, according to William R. Hewlett, the firm's president.

"Third-quarter results have been disappointing," Hewlett said. "Our domestic business exhibited continued strength, but not enough to offset weakness in our international orders, which were substantially below target.

"It appears that achieving last year's level of income will be extremely difficult unless we experience substantial improvement in international markets during the fourth quarter," he added.

As a whole, incoming orders for the quarter rose 11% to $291.1 million compared with the same period last year. For the nine months, orders rose 12% to $841.8 million compared with that year-ago period.

Domestic Orders

Broken down into the domestic and international sectors, domestic orders for the quarter rose 18% to nearly $155.4 million while international orders increased only 4% to $135.7 million.

During the quarter, revenues rose to $277.5 million compared with $245.9 million in the same period last year.

Earnings, however, were off to $18.5 million or 65 cents a share compared with $20.3 million or 73 cents a share in the year-ago quarter.

For the nine months, revenues grew 12% to $792.9 million compared with $706.3 million in the same period last year.

However, earnings dropped 9% to $57.3 million or $2.05 a share compared with nearly $62.7 million or $2.27 a share in the year-ago period.

In the nine months, domestic orders rose 15% to $428.1 million while international orders rose 8% to $413.8 million compared with the year-ago figures.

"In addition to delays in introducing new pocket calculator models, severe price erosion in this product line, felt earlier in the U.S., occurred in international markets. This led to a significant decline in profitability of our Singapore operation, which in turn necessitated an increase in our overall projected tax rate." Hewlett said.

DEC Posts Record Year As Earnings Climb 60%

MAYNARD, Mass. – Digital Equipment Corp. managed to amass record revenues and earnings for the fourth quarter and year ended July 3, with earnings for the year reaching $73.4 million, up 60% over those of a year ago. Revenues rose 38%.

During the quarter, revenues rose 45% to nearly $232 million compared with $160.5 million in the year-ago period.

Earnings grew to $26.8 million or $2.11 a share compared with $17.4 million or $1.46 a share in the same quarter last year.

For the year, revenues rose to $736.3 million compared with $533.8 million last year.

Earnings totaled $73.4 million or $5.94 a share compared with $46 million or $3.85 a share last year.

The firm cited a number of factors in its strong performance: the availability of new computer and software systems, strong worldwide demand for products and services and the expanded use of manufacturing resources. Orders outpaced shipments throughout the year, it noted.

DEC plans to proceed with aggressive plant and personnel expansion, a spokesman said. During 1976 the firm added about one million square feet of space and plans to expand by two million square feet this year. Employment reached 25,000 people worldwide.

The company said it expects improving economic conditions will give it the opportunity to increase sales and earnings.

Modcomp Dive in Second Quarter Results in Loss of $3.8 Million

FORT LAUDERDALE, Fla. – Modular Computer Systems, Inc.'s (Modcomp) results took a nose dive in the second quarter, resulting in a loss for the six months as well as the quarter.

For the second quarter ended June 30, the firm revealed a loss of $3.8 million or $1.37 a share, which includes $1 million in inventory write-down and $1 million inventory reserve, according to a spokesman.

The loss stemmed from much lower than expected shipments, higher than expected costs of goods sold and expenses as well as the inventory adjustments and reserves, the company said.

Revenues for the second quarter declined to $7.1 million compared with $9 million in the year-ago period.

One reason for the decline in revenues was the loss of some contracts because of disagreements during negotiations, a spokesman said.

When the firm realized it would incur a $4 million shortfall in revenues, it then concentrated on expediting orders scheduled for shipment in the next quarter. Many of these were not completed in time and did not show on the books as revenues, the spokesman said.

One prospective contract, which the spokesman declined to identify but which is believed to have been with the North Atlantic Treaty Organization, Modcomp had been working toward for over a year when negotiations fell through.

About the beginning of the year, Modcomp changed its policy of accepting orders to reduce acceptance of risky contracts obtained for the sake of revenues. Instead, the firm is selecting orders of a better quality which promise to be more profitable, the spokesman said.

This policy was reflected in part by the lack of revenues in the second quarter, he observed.

Modcomp's acquisition of ECS Information Systems, Inc. is expected to be completed shortly, pending settlement of some legal matters by ECS, a spokesman said.

ECS holders will receive an increased number of Modcomp shares because of the price drop of Modcomp stock. Modcomp was quoted at $11.25 July 28 and as of Aug. 18 was $5.25.

Modcomp is currently negotiating with its banks to remedy certain defaults in its loan agreement caused by the results. The firm has changed from an unsecured to a secured loan.

The banks have indicated a willingness to advance additional funds in the interim.

In the six months, revenues dropped to $16.9 million compared with $17.7 million a year ago.

The firm lost $3.6 million or $1.28 a share compared with earnings of $1.1 million or 42 cents a share in the same period last year.

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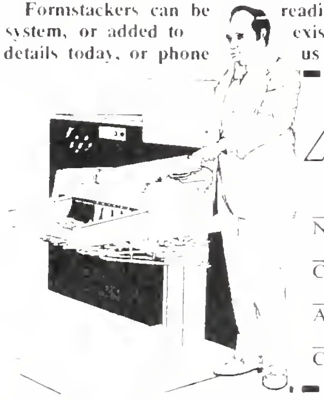

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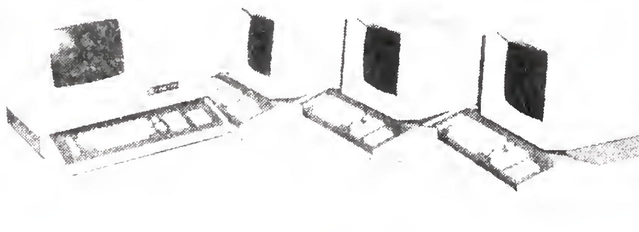

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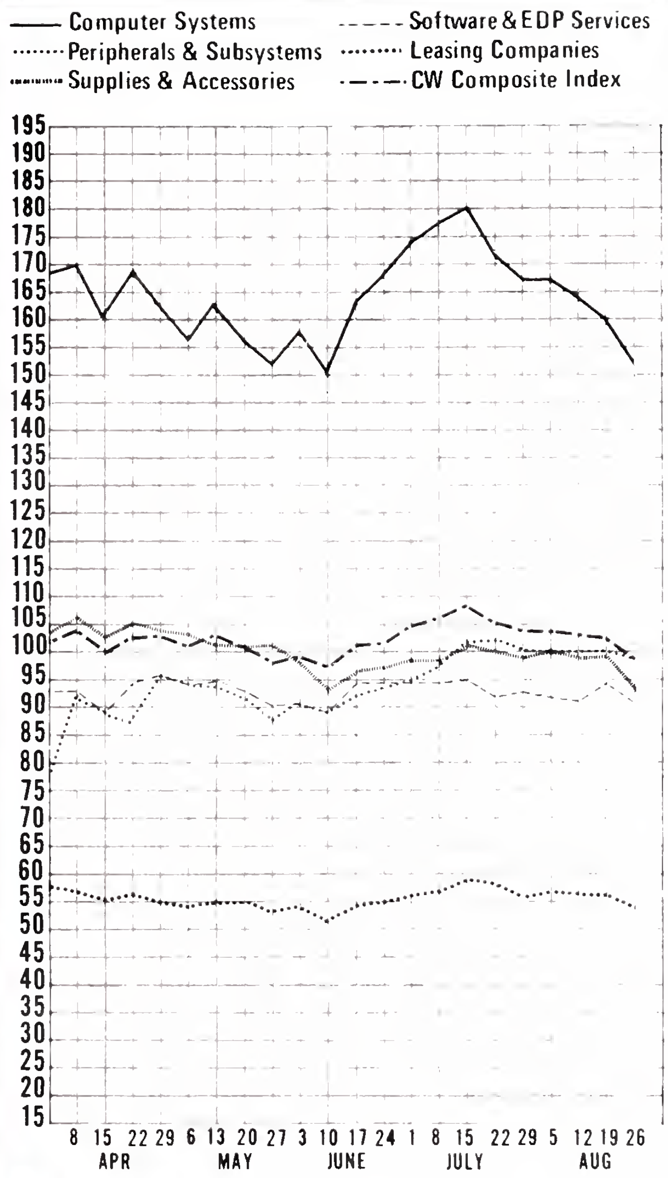

Earnings Reports

MANAGEMENT ASSISTANCE

Three Months Ended March 31

	1976	a1975
Shr Ernd	$.10	$.01
Revenue	28,718,000	21,910,000
Spec Cred	c1,037,000	b(383,000)
Earnings	3,058,000	383,000
6 Mo Shr	.20	.08
Revenue	57,106,000	44,795,000
Spec Cred	c2,563,000	e110,000
Earnings	6,043,000	2,397,000

a-Restated to reflect accounting change for foreign currency translation. b-Includes $592,000 write-off of settlement agreement less tax-loss carryforward credit of $209,000. c-Tax-loss carryforward. e-Includes $702,000 tax-loss carryforward credit and $592,000 write-off of settlement agreement.

PERTEC

Three Months Ended March 26

	1976	1975
Shr Ernd	$.27	$.28
Revenue	11,131,000	12,990,000
Earnings	858,000	859,000
9 Mo Shr	.78	.59
Revenue	36,690,000	34,530,000
Earnings	2,485,000	1,819,000

MEDTRONIC

Year Ended April 30

	1976	a1975
Shr Ernd	$1.77	$1.36
Revenue	129,971,000	99,766,000
Disc Op	(240,000)	44,000
Earnings	13,085,000	9,463,000
3 Mo Shr	.40	.37
Revenue	33,340,000	29,915,000
Disc Op	(48,000)	(36,000)
Earnings	3,006,000	2,710,000

a-Restated.

TELEX

Year Ended March 31

	1976	1975
Shr Ernd	$.62	$.13
Revenue	106,243,000	106,116,000
Spec Cred	a2,967,000	c395,000
Earnings	6,600,000	1,397,000
3 Mo Shr	.18	.06
Revenue	28,580,000	24,777,000
Spec Cred	b792,000	c395,000
Earnings	1,874,000	646,000

a-Consists of $2.6 million tax-loss carryforward and $399,000 gain from early extinguishment of debt. b-Consists of $724,000 tax credit and $68,000 gain from early extinguishment of debt. c-Tax-loss carryforward.

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Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, AUGUST 25, 1976

All statistics compiled, computed and formatted by
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Cambridge, Mass. 02139

COMPUTER SYSTEMS

EXCH		1976 RANGE (1)	CLOSE AUG 25 1976	WEEK NET CHNGE	WEEK PCT CHNGE
N	BURROUGHS CORP	84-108	91 7/8	+2 5/8	+2.9
O	COMPUTER AUTOMATION	10- 19	14 7/8	- 3/8	-2.4
N	CONTROL DATA CORP	18- 27	22 1/8	-1 1/8	-4.8
N	DATA GENERAL CORP	40- 60	47 5/8	-2	-4.0
O	DATAPOINT CORP	24- 46	33	-1	-2.9
O	DIGITAL COMP CONTROL	2- 7	5 1/4	- 1/8	-2.3
N	DIGITAL EQUIPMENT	138-181	163 1/4	-10 1/2	-6.0
N	ELECTRONIC ASSOC.	2- 5	2 5/8	- 1/8	-4.5
A	ELECTRONIC ENGINEER.	7- 16	8 1/2	- 7/8	-9.3
N	FOXBORO	28- 47	44 1/4	-1 3/8	-3.0
O	GENERAL AUTOMATION	5- 11	6 7/8	- 3/4	-9.8
O	GRI COMPUTER CORP	1- 1	1/2	0	0.0
N	HEWLETT-PACKARD CO	85-117	87	-15	-14.7
N	HONEYWELL INC	34- 56	44 5/8	-2 3/4	-5.8
N	IBM	227-280	272	-7 1/2	-2.6
O	MANAGEMENT ASSIST	1- 3	1 7/8	0	0.0
O	MEMOREX	18- 33	22 3/4	-3 1/4	-12.5
O	MICRODATA CORP	10- 27	24	-3 1/8	-11.5
O	MODULAR COMPUTER SYS	5- 14	5 1/4	0	0.0
N	NCR	24- 36	33 1/8	-1 7/8	-5.3
O	PRIME COMPUTER INC	4- 14	11 1/2	- 1/2	-4.1
N	PERKIN-ELMER	19- 27	20 1/2	- 1/2	-2.3
N	RAYTHEON CO	45- 66	59 1/4	-4 1/8	-6.5
N	SPERRY RAND	40- 52	44	-2 1/8	-4.6
O	SYCOR INC	20- 31	21	-2	-8.6
A	SYSTEMS ENG. LABS	6- 10	7 7/8	- 1/4	-3.0
N	VARIAN ASSOCIATES	13- 17	13 5/8	- 1/2	-3.5
A	WANG LABS.	11- 20	15 1/4	- 3/8	-2.3

LEASING COMPANIES

EXCH		1976 RANGE (1)	CLOSE AUG 25 1976	WEEK NET CHNGE	WEEK PCT CHNGE
O	COMDISCO INC	3- 10	7 1/2	- 1/4	-3.2
A	COMMERCE GROUP CORP	2- 3	2 3/4	+ 1/4	+10.0
A	COMPUTER INVSTRS GRP	1- 3	2	- 1/4	-11.1
M	DATRONIC RENTAL	0- 1	1 1/8	0	0.0
A	DCL INC	1- 1	5/8	+	+10.0
N	DPF INC	5- 8	6 1/2	- 5/8	-8.7
A	GREYHOUND COMPUTER	3- 8	7 3/8	0	0.0
N	ITEL	6- 15	12 3/8	- 5/8	-4.8
N	LEASCO CORP	6- 19	15 1/4	-1	-6.1
O	LEASPAC CORP	0- 1	1/4	0	0.0
O	NRG INC	0- 1	3/8	0	0.0
A	PIONEER TEX CORP	6- 9	7 5/8	+ 1/8	+1.6
N	U.S. LEASING	7- 12	9	- 7/8	-8.8

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH
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SOFTWARE & EDP SERVICES

EXCH		1976 RANGE (1)	CLOSE AUG 25 1976	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED COMP TECH	1- 3	2	0	0.0
O	ANACOMP INC	8- 11	8 1/8	+ 1/8	+1.5
A	APPLIED DATA RES.	2- 4	3 3/4	- 1/4	-6.2
N	AUTOMATIC DATA PROC	17- 35	30 5/8	-1 5/8	-5.0
O	COLEMAN AMERICAN COS	3- 6	2 1/2	0	0.0
O	COMPUTER DIMENSIONS	3- 7	5 1/4	- 1/8	-2.3
O	COMP ELECTION SYSTMS	5- 9	5 1/4	- 1/2	-8.6
O	COMPUTER HORIZONS	1- 2	1 3/4	- 1/4	-12.5
O	COMPUTER NETWORK	2- 6	3 5/8	+ 1/4	+7.4
N	COMPUTER SCIENCES	4- 8	6 1/4	- 1/2	-7.4
O	COMPUTER TASK GROUP	1- 1	1 3/8	+ 1/8	+10.0
O	COMPUTER USAGE	3- 6	3	- 1/8	-4.0
O	COMSHARE	2- 9	5	-1	-16.6
O	DATA DIMENSIONS INC	2- 4	2 3/4	- 1/8	-4.3
O	DATATAB	1- 1	1 1/4	0	0.0
N	ELECTRONIC DATA SYS.	12- 18	17	- 1/4	-1.4
O	INFONATIONAL INC	1- 1	1/8	0	0.0
O	INSYTE CORP	1- 3	1 1/2	0	0.0
O	IPS COMPUTER MARKET.	1- 2	1 1/8	0	0.0
O	KEANE ASSOCIATES	2- 4	2 3/8	- 1/4	-9.5
O	KEYDATA CORP	2- 5	1 7/8	+ 1/8	+7.1
O	LOGICON	3- 4	3 5/8	0	0.0
A	MANAGEMENT DATA	1- 3	2	0	0.0
A	NATIONAL CSS INC	13- 25	21 3/4	- 3/4	-3.3
A	ON LINE SYSTEMS INC	18- 22	19 7/8	-1 1/2	-7.0
N	PLANNING RESEARCH	3- 5	3 1/2	- 1/8	-3.4
O	PROGRAMMING & SYS	1- 1	3/8	0	0.0
O	RAPIDATA INC	2- 5	2 1/4	- 1/8	-5.2
O	REYNOLDS & REYNOLD	13- 21	16	-1 1/4	-7.2
O	SCIENTIFIC COMPUTERS	1- 1	3/4	0	0.0
O	TYMSHARE INC	19- 28	25 3/8	-1 3/8	-5.1
A	URS SYSTEMS	3- 6	3 5/8	- 5/8	-14.7
N	WYLY CORP	2- 7	1 3/4	- 5/8	-26.3

PERIPHERALS & SUBSYSTEMS

EXCH		1976 RANGE (1)	CLOSE AUG 25 1976	WEEK NET CHNGE	WEEK PCT CHNGE
N	ADDRESSOGRAPH-MULT	8- 13	9 1/8	- 1/4	-2.6
O	ADVANCED MEMORY SYS	4- 10	6 3/8	- 1/4	-3.7
N	AMPEX CORP	5- 10	7 5/8	- 7/8	-10.2
O	ANDERSON JACOBSON	2- 4	2 3/4	0	0.0
O	APPLIED DIG DATA SYS	13- 25	19 1/4	-1	-4.9
O	BEEHIVE MEDICAL ELEC	3- 9	7 3/4	- 3/4	-8.8
A	BOLT,BERANEK & NEW	7- 11	8 3/4	- 5/8	-6.6
N	BUNKER-RAMO	5- 10	7 3/4	- 1/2	-6.0
A	CALCOMP	4- 7	5	- 1/4	-4.7
O	CAMBRIDGE MEMORIES	0- 6	5/8	0	0.0
N	CENTRONICS DATA COMP	20- 36	31	-1 5/8	-4.9
O	CODEX CORP	22- 42	34 1/2	- 1/2	-1.4
O	COGNITRONICS	1- 1	7/8	0	0.0
O	COMPUTER COMMUN.	1- 6	5 1/4	0	0.0
O	COMPUTER CONSOLES	4- 7	5 3/4	0	0.0
A	COMPUTER EQUIPMENT	1- 3	1 5/8	+ 1/8	+8.3
O	COMPUTER TRANSCEIVER	1- 3	7/8	0	0.0
O	COMTEN	4- 9	6 1/2	- 1/4	-3.7
N	CONRAC CORP	20- 25	20 1/4	-1 7/8	-8.4
O	DATA ACCESS SYSTEMS	1- 4	3 1/4	0	0.0
O	DATA 100	7- 13	7 7/8	- 1/4	-3.0
A	DATA PRODUCTS CORP	5- 15	12 1/2	- 5/8	-4.7
O	DATA TECHNOLOGY	1- 2	1 5/8	+ 1/8	+8.3
O	DATUM INC	1- 2	1 1/2	0	0.0
O	DECISION DATA COMPUT	1- 4	1 3/8	- 3/8	-21.4
O	DELTA DATA SYSTEMS	1- 1	1	- 1/8	-11.1
N	ELECTRONIC M & M	1- 4	3 3/8	- 3/8	-10.0
O	FABRI-TEK	1- 1	5/8	0	0.0
O	GENERAL COMPUTER SYS	1- 2	1 1/8	0	0.0
N	HAZELTINE CORP	4- 12	7 3/4	- 7/8	-10.1
N	HARRIS CORP	34- 55	51	-1 1/4	-2.3
A	INCOTERM CORP	9- 20	8 7/8	- 3/8	-4.0
O	INFOREX INC	3- 7	3 7/8	- 1/8	-3.1
O	INFORMATION INTL INC	10- 18	11 5/8	0	0.0
O	INTEL CORP	59-100	61 1/2	-2	-3.1
A	LUNDY ELECTRONICS	4- 7	3 3/4	0	0.0
O	MSI DATA CORP	3- 7	6 1/8	- 5/8	-9.2
A	MILGO ELECTRONICS	15- 21	15 7/8	- 3/4	-4.5
N	MOHAWK DATA SCI	3- 11	3 1/8	- 7/8	-4.7
O	PENRIL CORP	1- 3	2 1/4	+ 1/8	+5.9
A	PERTEC CORP	3- 8	6 5/8	+ 1/8	+1.9
A	POTTER INSTRUMENT	2- [illegible]	1 3/4	0	0.0
O	PRECISION INST.	5- 10	4 1/2	0	0.0
O	QUANTOR CORP	4- 6	4 1/2	- 3/8	-7.6
O	RECOGNITION EQUIP	[illegible]- 11	7 3/8	- 3/4	-9.2
A	SANDERS ASSOCIATES	6- 11	8	- 1/4	-3.0
	SCAN DATA	2- 4	2	- 1/8	-5.8
N	STORAGE TECHNOLOGY	9- 13	11	- 3/4	-6.3
O	T-BAR INC	5- 10	5 1/2	- 1/8	-2.2
O	TALLY CORP.	4- 6	4 1/4	- 1/4	-5.5
O	TEC INC	3- 5	3 3/4	0	0.0
N	TEKTRONIX INC	45- 67	61 1/8	-2 5/8	-4.1
N	TELEX	2- 5	3	- 1/8	-4.0
O	WANGCO INC	11- 22	21 1/8	0	0.0
O	WILTEK INC	2- 2	2 3/8	- 1/4	-9.5

SUPPLIES & ACCESSORIES

EXCH		1976 RANGE (1)	CLOSE AUG 25 1976	WEEK NET CHNGE	WEEK PCT CHNGE
	ADVANCED SYSTEMS INC	1- 4	3 1/4	0	0.0
O	BALTIMORE BUS FORMS	3- 5	3	- 1/4	-7.6
A	BARRY WRIGHT	6- 10	7 3/8	0	0.0
O	CYBERMATICS INC	1- 1	1/2	- 1/8	-20.0
A	DATA DOCUMENTS	25- 42	25 3/8	-3 1/8	-10.9
O	DUPLEX PRODUCTS INC	14- 24	13 7/8	- 1/4	-1.7
N	ENNIS BUS. FORMS	6- 8	6 7/8	- 1/4	-3.7
O	GRAHAM MAGNETICS	8- 13	9 1/4	- 1/2	-5.1
O	GRAPHIC CONTROLS	13- 19	14 3/4	-1	-6.3
N	3M COMPANY	53- 65	61 5/8	-2 1/8	-3.3
O	MOORE CORP LTD	38- 51	38 1/2	-2 1/4	-5.5
N	NASHUA CORP	11- 19	16 1/4	- 3/4	-4.4
O	STANDARD REGISTER	15- 19	15 1/4	- 3/4	-4.6
O	TAB PRODUCTS CO	5- 11	9	- 1/4	-2.7
N	UARCO	20- 25	20 1/4	- 3/4	-3.5
A	WABASH MAGNETICS	4- 8	7	- 1/8	-1.7
N	WALLACE BUS FORMS	19- 25	20 5/8	- 3/8	-1.7

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